Coal Age



TURNING THE RED TIDE . . . p. 70

Augering Underground • Tandem Stripping • Roof-Bolting
New Georgetown Central Plant • Trackless Mining at Lida B
Insuring Electrical Safety • Dense-Media Bank Recovery

'Constant Haulage' means Constant Production

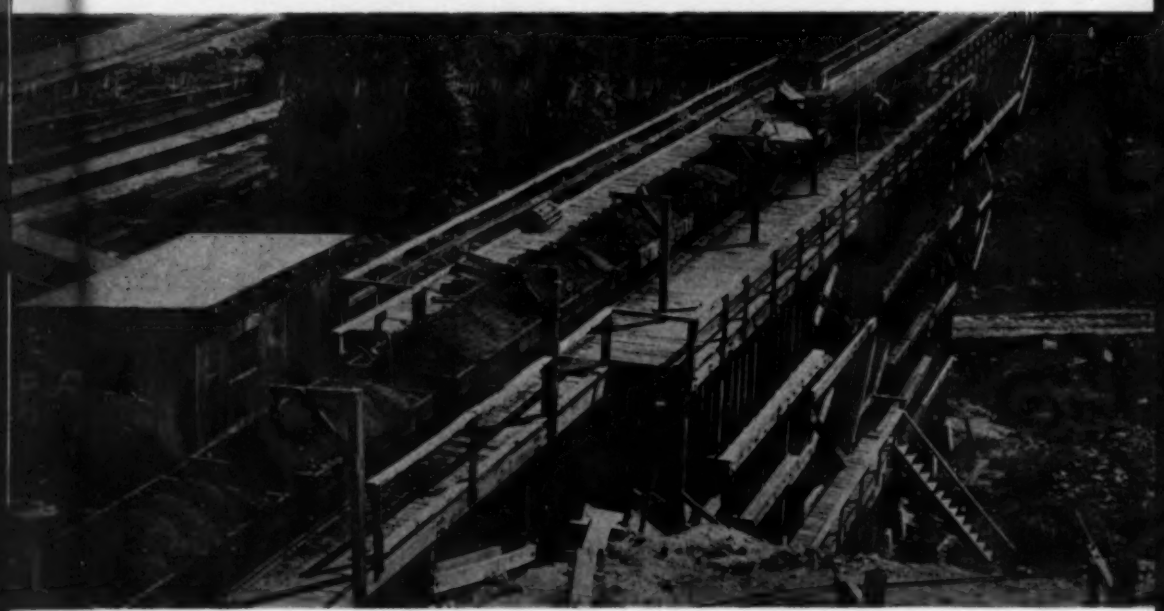
A.C.F. DROP BOTTOM MINE CARS unload coal so rapidly as to make possible those *extra* trips per shift; keep loaders working at maximum output. Cars are always on the move keeping the storage bin filled. The result is constant operation of the coal preparation plant—without interruption—to produce those extra tons of coal per shift, per day.

Remember the other great advantage of mine cars, too: *no haulage shutdowns.*

Discuss your coal handling problems with an A.C.F. Representative. He is anxious to acquaint you with the many advantages of using A.C.F. Drop Bottom Mine Cars in your mine.



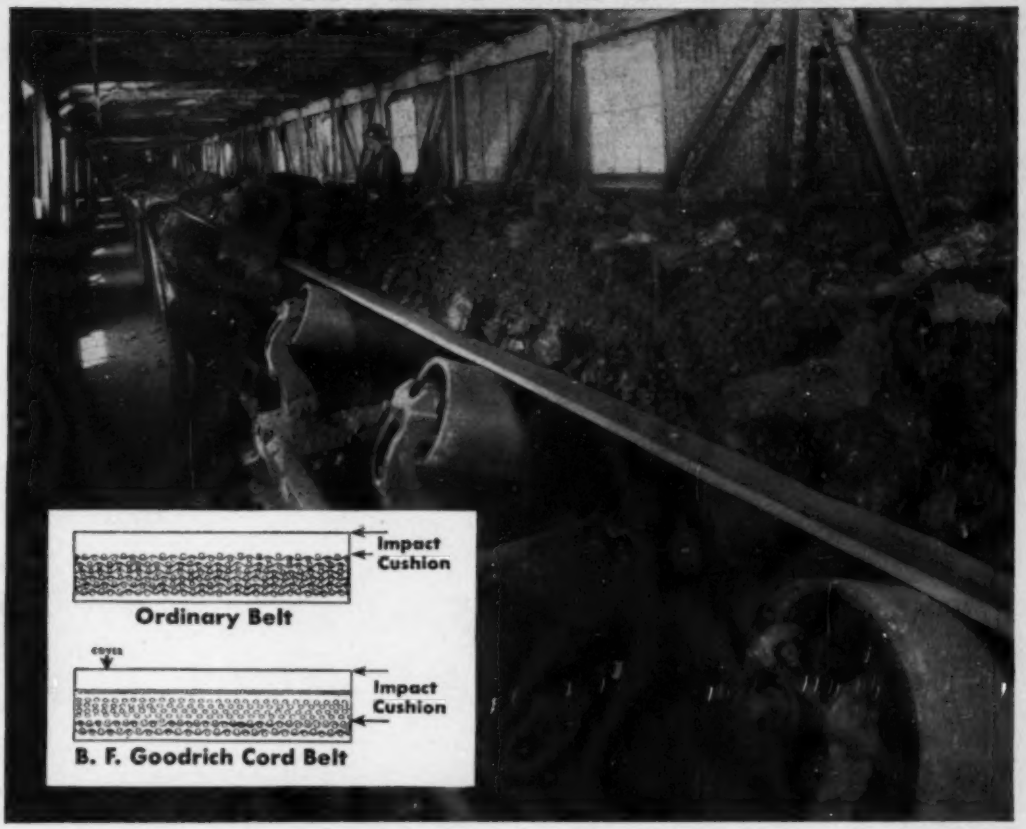
American Car and Foundry Company, New York
Chicago • St. Louis • Cleveland • Philadelphia
Washington • Huntington, W. Va. • Berwick, Pa.
San Francisco



A.C.F. MINE CARS

for Constant Haulage

RESEARCH KEEPS **B.F.Goodrich** FIRST IN RUBBER



12 years and 9 million tons with a B. F. Goodrich cord belt

Gives 2 to 6 times greater impact resistance

RUN-OF-MINE coal and refuse are carried here, where a B. F. Goodrich cord belt moved 9 million tons in 12 years of service. The coal drops 3 feet onto the belt. This is typical B. F. Goodrich cord belt service because:

Cord belt stands more impact—Each lengthwise cord in a B. F. Goodrich cord belt is completely surrounded by rubber—no cross threads tie them together. Cords are free to "give" when impact occurs. Rubber distorts temporarily, distributing and absorbing a shock that would damage stiff, unyielding plies. As an extra protection, B. F. Goodrich has added a patented *Transcord Breaker*—an extra layer of parallel cords in rubber, placed across belt width. Acts as a shock absorber, stretches to prevent gouges and cuts from splitting belt cover.

Cord belt troughs better—There being no crossweave in the cord plies, cords are free to flex. Belt conforms to idlers, pulleys. Spillage is reduced, troughing is natural and belt keeps centered on idlers, sustains less damage, requires less maintenance. Longer centers, higher lifts can be used.

The first B. F. Goodrich cord belt ever made is still on the job after 14 years and 16 million tons of rough-riding coal. If rock, coal, sand, gravel, ore or any other material rough-rides your conveyor, you can save money by calling in your local BFG distributor. *The B. F. Goodrich Company, Industrial and General Products Division, Akron, Ohio.*

Conveyor Belts BY
B.F.Goodrich
RUBBER FOR INDUSTRY

The Champion



DARING AIRMAN SPANS CONTINENT IN 1,176 HOURS!

Back in 1911 Calbraith Rodgers, backed by Armour & Company was the first flier to span the American continent. Even Orville Wright had called it "attempting the impossible". On September 17th Rodgers left Sheepshead Bay, N. Y. On November 3rd, 49 days and 69 landings later, after 3 days and 10 hours actual flying, and after rebuilding the entire plane 4 times, he landed in Pasadena! Rodgers averaged 51 miles an hour, flew 4231 miles, but was never really in the air much longer than 2 hours at a time. He was the Champion who first made the United States "air-conscious" from coast to coast.

HULBURT OIL & GREASE COMPANY
PHILADELPHIA, PA.
Specialists in Cost Value Lubrication



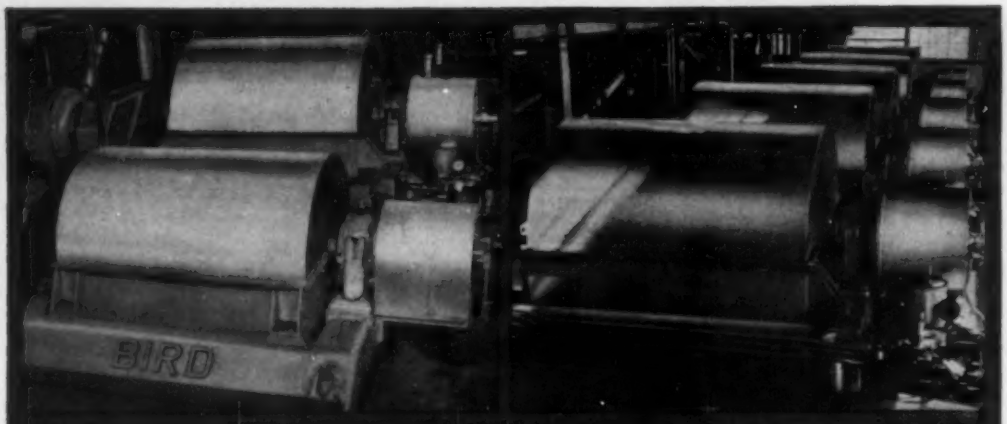
The Champion

...IN COAL MINE LUBRICATION



Hulburt Quality "The Champion" GREASE

Back in 1931 — a day back a good many long years before 1931 — Hulburt Quality Greases were doing the "impossible" in producing real dependable coal mining machinery. Such machinery was pretty crude compared to present standards — but the same Hulburt Grease is STILL being used to fight friction in today's modern "streamlined" machines — and doing a perfect job, too! No, you won't have to "specify" or "ask" for your machines when you use Hulburt Greases. They'll work on the job, they'll not be missing at a time, they won't have to be worked over, when you're "Hulburt-conscious" from one end of your mine to the other.



BIRDS Like These

Get The Water Out Of Your WASHED FINE COAL

...So Clean That There's No Longer A Disposal Problem

...At ONE-THIRD The Cost Of Other Dewatering Methods

The Bird Coal Filter whisks the water away from the fine coal as completely as mechanical separation permits.

In combination with the Bird Polisher it delivers clean water for re-use as desired. No water ever needs to leave the system.

BIRDS do the job at unbelievably low overall cost — as little as a nickel a ton for operation, labor, power, amortization — everything.

Maintenance averages less than 2 cents a ton, often under 1 cent.

Be sure you look into the BIRD whenever you tackle your fine coal preparation and waste disposal problem.

BIRD MACHINE COMPANY · South Walpole, Mass.

The BIRD Continuous Centrifugal COAL FILTER

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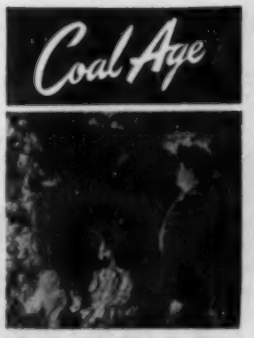
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THIS MONTH'S COVER

THE MINING JOB is explained by Maurice Fowler (right), safety engineer, Harwick mine of the Duquesne Light Co., as a part of the first-day safety orientation of a new miner described in July *Coal Age*. That continued emphasis on safety, coupled with special programs like this, pays off is indicated in the report that the Duquesne Light's Coal Div. recently took the two top places in a company-wide safety-improvement competition (p. 150 of this issue).

COMING IN OCTOBER

Who Mines Coal and Where—A special *Coal Age* analysis of the coal industry's production trends, company size and growth, and regional progress.

The Desco Miner—Design, construction and use of the new Canadian-developed continuous miner.

How Kemmerer Strips a 90-ft Seam under 158-ft of cover with scrapers, shovels and trucks.

The New Underground Diesel Locomotive—How it is built for the maximum in safety and what it offers in haulage benefits.

Trackless Mining with belt haulage produces 60 to 75 tpm at the Wellington, Utah, mine of The Coalcreek Coal Co., Inc.

TCI Automatic Fan Signal System with automatically connecting standby drives provides continuous ventilation supervision.

How Pruden Coal & Coke achieves haulage economies with drop-bottom cars and a new 2,590-ft belt.

COAL AGE SEPTEMBER, 1951
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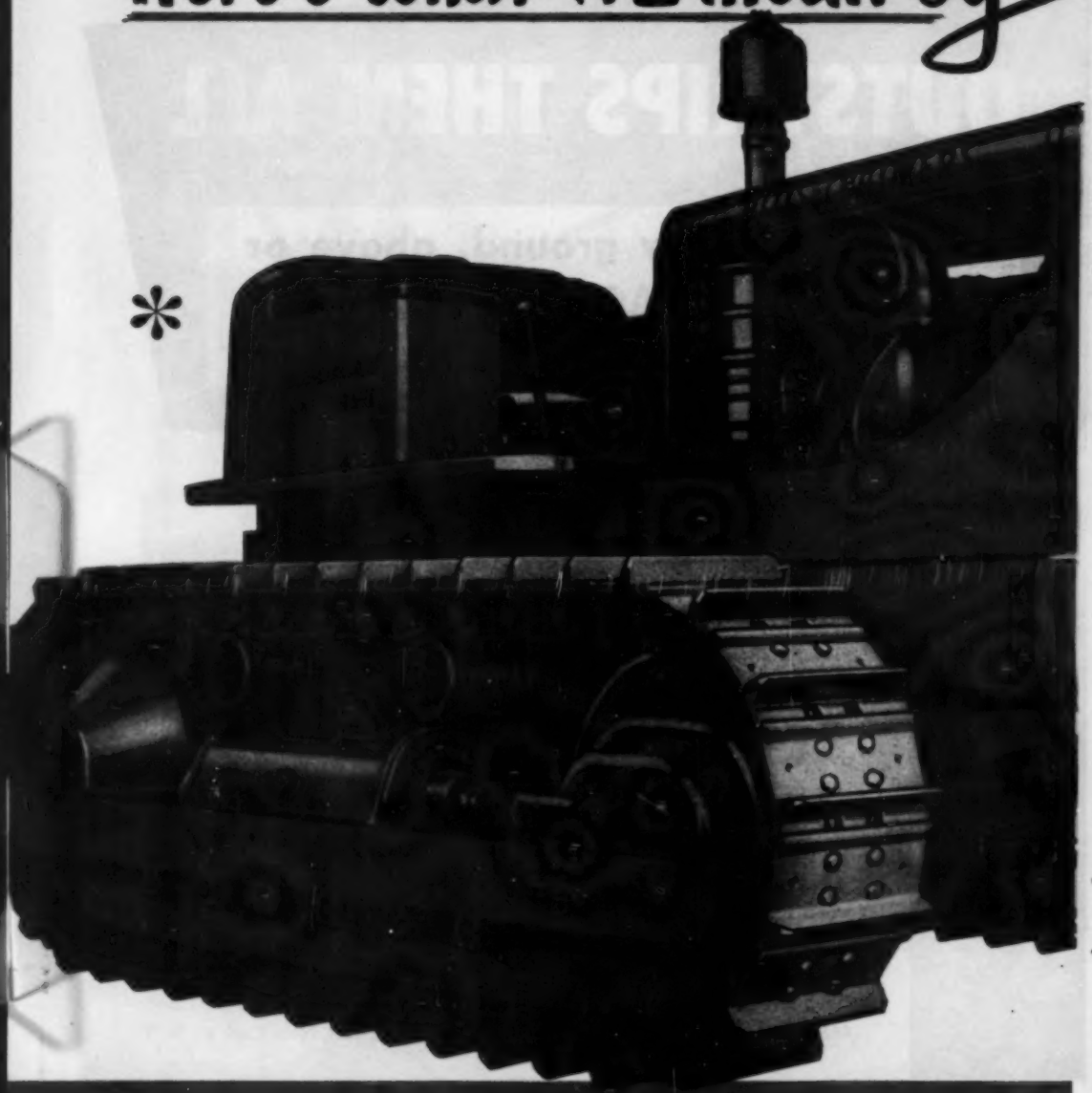
Texaco Regal Oils (R&O) have effective rust- and oxidation-inhibiting additives *plus* special processing to prevent foaming. Thus, *Texaco Regal Oils (R&O)* keep hydraulic systems clean, reduce wear and lengthen time between overhauls. *Texaco Regal Oils (R&O)* assure greater hydraulic efficiency and economy. There is a complete line to meet every service requirement.

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For the Coal Mining Industry

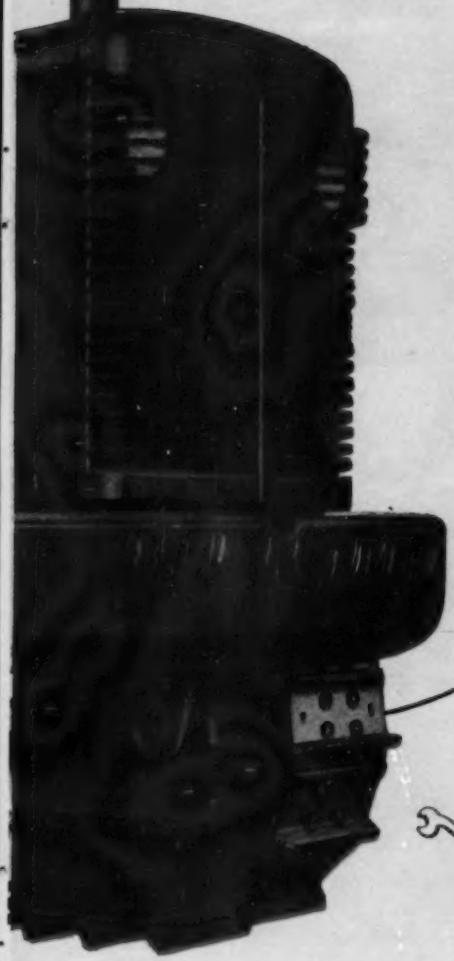
Here's what WE mean by



40.26 drawbar hp. 11,250 lb.	* 70 drawbar hp. 18,800 lb.	102 drawbar hp. 27,850 lb.	Hydraulic Torque Converter Drive 175 net engine hp. 41,000 lb.

DESIGNED FOR YOUR JOB • BUILT TO TAKE IT • EASY TO OPERATE • EASY TO SERVICE

EASY TO SERVICE



- Allis-Chalmers' new tractor line is blazing the way to simpler servicing with time and money savings never before possible.
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- Below are just a few reasons why this NEWEST, FINEST TRACTOR LINE ON EARTH is *Easy To Service* . . . besides being built to "take it," easy to operate and entirely new in performance. Get the full story from your Allis-Chalmers dealer.



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Only a few lube points, easy to get at — NONE UNDER TRACTORS. You operate 75 HOURS without any greasing — then only one fitting to hit and an oil change to make. (Only exception, torque converter bearings on HD-20). You lubricate the Positive-Seal truck wheels, support rollers and idlers only once every 1,000 HOURS!

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Goodman
HALSTED STREET

THE TYPE 860
A NEW Goodman LOADER
FOR LOW COAL

26½" over-all height **17" coal line height**

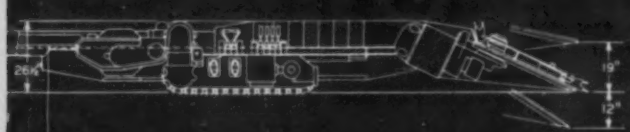
A TRACTOR TREAD LOADER
WITH THESE OPERATING FEATURES:

SWINGING LOADING HEAD
40° to either side of center line, 14 cubic path loaded out with only forward and backward movement of machine. Vertical loading range from 12" below bottom to 19" above.

SWINGING DISCHARGE END
40° to either side of center line. Can also be adjusted vertically to shuttle car or conveyor height, 30" maximum. Cantilever loading arm counterpoised.

LOADING EFFICIENCY
Action of gathering chains and arms is continuous. Single strand chain moves coal steadily from head to discharge end. Powerful digging ability in tight coal, excellent clean-up. Counterbalance springs permit head to float when loading on rolling bottom. No "digging in."

FULL HYDRAULIC CONTROL
All movements of loader positive and smooth. Levers grouped 10 feet back from end of loading head. Low pressure in hydraulic system promotes long life of all parts. Relief valves protect against shock loads, special circuit enables operation of loader should either of two hydraulic pumps fail.



MANUFACTURING COMPANY
AT 48TH • CHICAGO 9 ILLINOIS

Here's how rubber-tired TOURNADOZER speeds pit maintenance



STRIPS SHALE THE YEAR 'ROUND

At Middle Branch, Ohio, Diamond Portland Cement Co., strips shale year 'round with C Tournadozer. "Will move as much shale in ½ day as our crawler can in a full day," says Vice President E. K. Evans. For clean-up at plant, Tournadozer runs 3 miles from plant to pit over asphalt roads in a few minutes.

You get action-fast

Tournadozer works anywhere . . . any time, "runs" on big 21.00 x 25 low-pressure tires at speeds up to 19 m.p.h. Tournadozer works in toughest footings . . . up steep grades . . . in any kind of weather . . . through mud, sand, or snow which would stall ordinary crawlers. At a moment's notice, operator can drive rig anywhere over highway or cross country to distant pushing, pulling or dozing assignments. No delays for trailer, blocking, loading or unloading.

With a standard bulldozer blade or interchangeable Angledozer blade or V-type Snow Plow, plus its ability to tow a Rooter or haul Scrapers, Tournadozer is an all-year tool. It has fast, 4-wheel drive on rubber, instant gear change with constant-mesh transmission, torque converter, powerful 4-wheel, disc-type air brakes with a total of 2822 sq. in. braking area, plus fast, easy fingertip electric control.

Check actual job performance reports shown here. Ask your LeTourneau Distributor for additional output figures and other facts on versatile Tournadozer.

Tournadozer, Tournapull, Carryall, Angledozer, Rooter—Trademarks Reg. U. S. Pat. Off. E149-m

LETOURNEAU LET EQUIPMENT

HIGH-SPEED, RUBBER-TIRED EXCAVATING • HAULING • LIFTING EQUIPMENT



GRADES AND MAINTAINS ROADS

At pit north of Arctic Circle at Kirkenes, Norway, over 25 million yds. of rock ore being removed to uncover magnetite ore. Sydvaranger, A/S, Oslo, started hauling with six 40-ton, rear-dump Tournarochars, later added 6 more plus 2 C Tournadozers. Dozers build and maintain haul roads and handle shovel clean-up. Combined, the 14 units are moving 12,000 tons of rock and ore per day.



SHOVEL CLEAN-UP

Working at Stanley Mining Company's ore pit at Biwabik, Minn., Tournadozer's principal job is handling clean-up around the ore shovel. On this multi-handling, 24-hr., 7-day a week ore operation, Tournadozer utilizes normal waiting periods to maintain rock dump, clean spillage at crushing plant . . . feed material from surge pile to hopper . . . clear timber ahead of rock drill, etc. Rig has 4 speeds forward, 2 reverse.



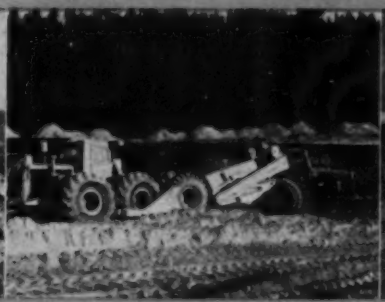
DOZES ORE INTO GRIZZLY

On bauxite stripping near Little Rock, Arkansas, 1 Tournadozer handles 5 major jobs every day . . . is on call 24 hours a day. It dozes bauxite ore into 4 to 8 grizzlies . . . maintains quarry rock stockpile . . . cleans up around two 2½-yd. shovels . . . pulls 12-yd. wagon to haul and spread waste material. "It's been doing the work of 2 crawlers," reports the Plant Supt. Operator can change gears without stopping.



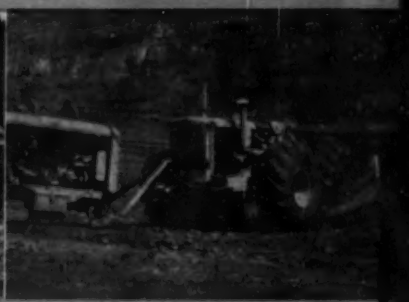
MAINTAINS DUMPS

Tournadozer's high-speed and rubber-tired mobility enables it to keep busy day and night for the E. W. Coons Co. at the Genoa strip mine at Eveleth, Minn. During one typical 10-hour night shift, the big rig maintained 2 overburden dumps and loam ore stockpile, did clean-up work around 3 stripping shovels, found time to do haul road maintenance besides. No wonder this firm likes their Super C Tournadozer!



PUSH LOADS SCRAPERS

J. Neils Lumber Co., Libby, Montana, teamed this C Tournadozer with 2 C Tournapulls on an 800,000-yd. access road near Rexford. With Tournapulls on 2000' cycles, Tournadozer pushed 42 loads of sand an hour . . . with Pulls on 600' cycles, 54 loads hourly. Load distance for 9½ pay yards averaged 75' . . . load time, 30 seconds. With Angledozer blade mounted, rig speeds sidehill work.



PULLS HEAVY EQUIPMENT

Skidding heavy compressor in one of many maintenance jobs Tournadozer handled around Interstate Iron Co. mines near Calumet, Minn. The "C's" big, 186 h.p. diesel engine and 4-wheel drive develop plenty of drawbar pull to handle heavy loads. It pulls Carryall-Scrapers, tow Rooters, heavy-duty trailers, bogged down trucks; slides generator plants, cable-boats, poles, piling, etc.



SPOTS RAILROAD CARS

Here, versatile Tournadozer spots empty rail cars under ore loader for Hanabi Iron Range Mining Company. Powerful rig is handy for switching cars . . . keeps sidings clear for incoming freight. Tournadozer takes shortest route between jobs . . . rubber tires permit it to cross or follow tracks anywhere without planking. Instant-shift gear selection keeps unit pushing, without losing momentum.



WORKS SCATTERED JOBS

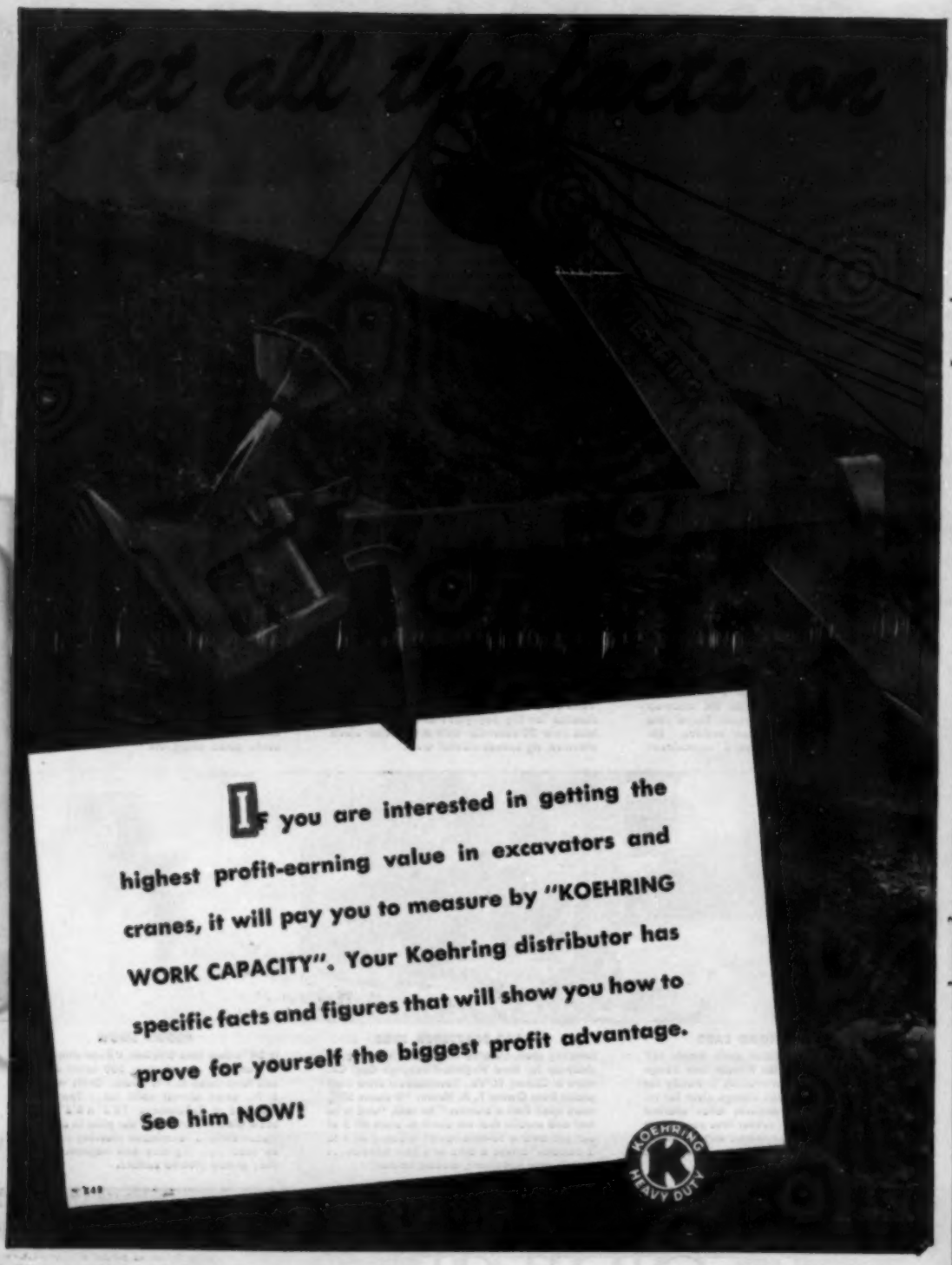
Leveling spoil, clearing snow, and handling pit clean-up for West Virginia-Pittsburgh Coal Co. mine at Collier, W. Va., Tournadozer drew high praise from Owner P. A. Haro. "In dozen 50% more spoil than a crawler," he said, "and is so fast and mobile that we use it to work all 5 of our pits over a 10-mile route. It saves us 1 to 2 tractors." Drives a mile in a few minutes . . . travels over pavement, crosses tracks.



PLOWS SNOW

In 34° below zero weather, a Rural Municipality in Manitoba cleared over 600 miles of roads and farm lanes in 142 hours. Drifts were 3 to 8 ft., some almost solid ice. Tournadozer mounted a LeTourneau 12'3" x 6'6" V-type snow plow. Vertical divider plate in center cuts frozen drifts . . . eliminates plowing snow back on road . . . big tires and adjustable runner shoes protect plowed surface.

R.G. LeTOURNEAU, INC., PEORIA, ILLINOIS


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IF you are interested in getting the highest profit-earning value in excavators and cranes, it will pay you to measure by "KOEHRING WORK CAPACITY". Your Koehring distributor has specific facts and figures that will show you how to prove for yourself the biggest profit advantage.
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JOY, the *pioneer* in modern methods of high-production trackless mining, builds compact, highly efficient machines for every mining condition. • Let us help *you* to increase tonnage and reduce costs... WRITE FOR INFORMATION.



The JOY 14-BU Loader, for heavy-duty, high-production loading. Having an over-all height of only 30¼ inches, the 14-BU operates efficiently in seams as low as 34 inches, with a capacity of 5 to 8 tons per minute.

The JOY 10-SC Shuttle Car is designed for heavy-duty work in full seam production. Extra rugged construction assures continuous operation. The 10-SC is a four-wheel drive, four-wheel steering, hydraulically controlled machine for working in close quarters, and may have fixed or hydraulic adjustable elevating discharge.





For higher tonnage and lower costs

Consult a Joy Engineer



W&D CL3800

JOY MANUFACTURING COMPANY

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IN CANADA: JOY MANUFACTURING COMPANY (CANADA) LIMITED, GALT, ONTARIO

Be prepared

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for the MINER

M·S·A
SELF-RESCUER

When deadly after-damp (Carbon-Monoxide) is produced by fire or explosion, this M.S.A. Self-Rescuer gives the miner the precious minutes of protection he must have to escape to an uncontaminated area, or to the outside. Convenient underground storage of the M.S.A. Self-Rescuer throughout the mine is possible with the cache assembly which consists of 6 Self-Rescuers complete in a sturdy metal case. U.S. Bureau of Mines approval 1447. Ask for Bulletin No. EC-1.

FEATURES

Compact . . . Lightweight . . . Can be stored in quantity in small place . . . Chemical Cartridge hermetically sealed . . . Stored without deterioration . . . Visual inspection easily made . . . Economically replaced for training program . . . Easily transported . . . New, comfortable nose clip design . . . Adjustable supporting neck band prevents loss of Rescuer when in use.

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for Emergencies...with this

Breathing Protection

for the RESCUE team



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Providing complete breathing protection in any atmosphere for a minimum of 45 minutes, the M.S.A. Chemox permits immediate emergency rescue operations by men near the scene. Chemox generates its own oxygen supply from a chemical cartridge—all the wearer does is breathe. It weighs only 13 lbs.

The replaceable canister can be stored indefinitely without deterioration, assuring instant availability when needed. Bureau of Mines Approval No. 1307. Ask for Bulletin No. B-14.





When you have a safety problem, M.S.A. is at your service. Our job is to help you.

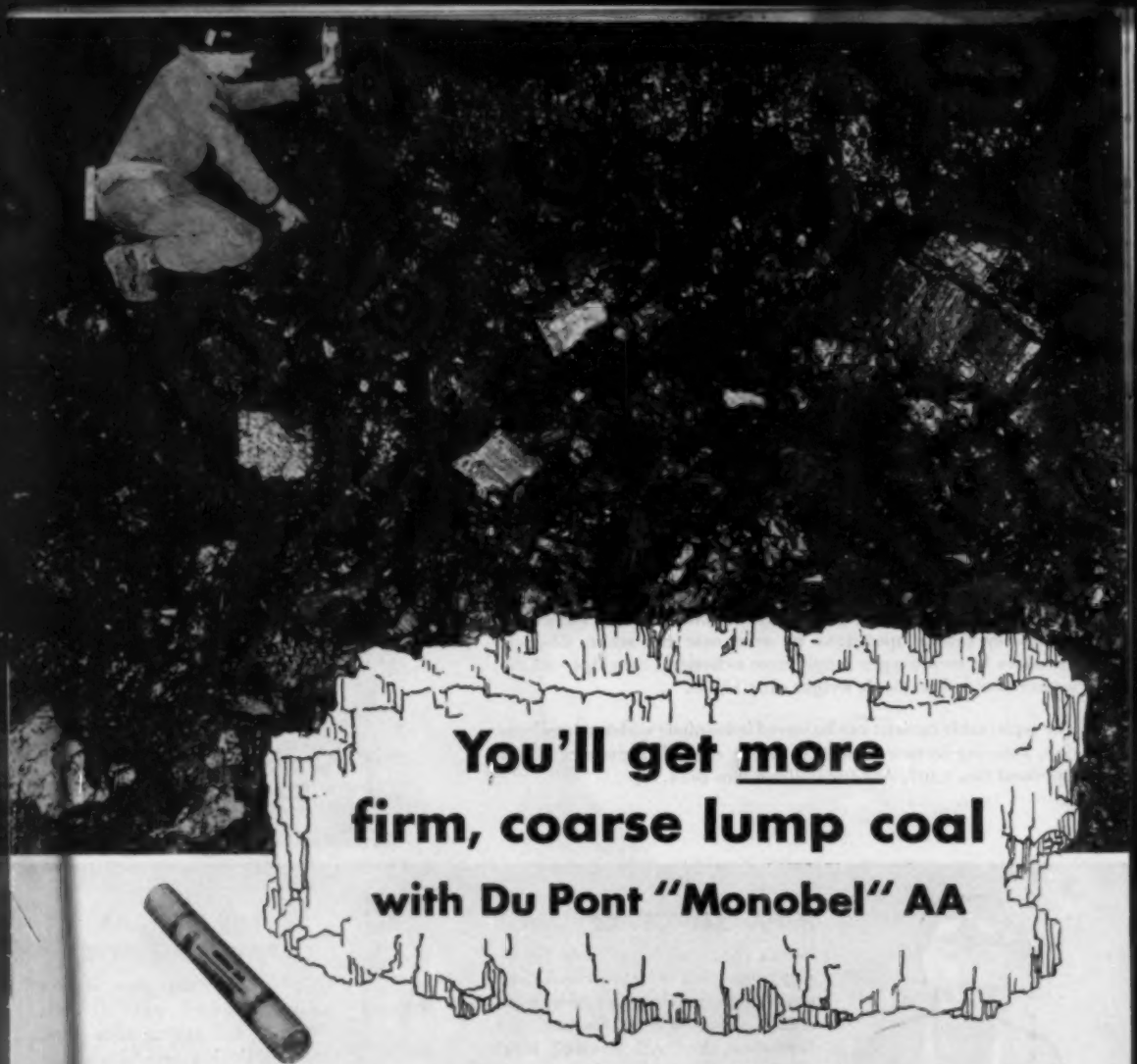
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BRADDOCK, THOMAS AND MEADE STREETS
PITTSBURGH 8, PA.

At Your Service
54 BRANCH OFFICES IN THE UNITED STATES AND CANADA

SAFETY EQUIPMENT HEADQUARTERS

MSA



You'll get more firm, coarse lump coal with Du Pont "Monobel" AA

Once you start shooting with "Monobel" AA, you'll see there's a big difference in the amount of top-grade lump coal you get per ton—and the speed with which you get it.

This popular permissible does an economical blasting job in high, hard-shooting seams. Because of its high bulk strength and low velocity, "Monobel" AA produces a heaving action that shears coal evenly, both at the back and on the ribs. It throws coal clear of the face . . . out where mechanical loaders can easily handle it.

"Monobel" AA has excellent water-resistance. It's ideal for top or bottom cutting even in the wettest mines. And, you'll take less time away from the face because its fumes are Class A . . . another money-saving advantage.

For more usable lump coal per ton—in less time—try "Monobel" AA. You'll soon see why it's the world's largest-selling permissible. Feel free to call on your Du Pont Explosives representative at any time. He'll be glad to give you complete information on "Monobel" AA and other well-known, dependable Du Pont permissibles. E. I. du Pont de Nemours & Co. (Inc.), Explosives Dept., Wilmington 98, Del.

DU PONT PERMISSIBLES

Blasting Supplies and Accessories

DU PONT

REG. U.S. PAT. OFF.

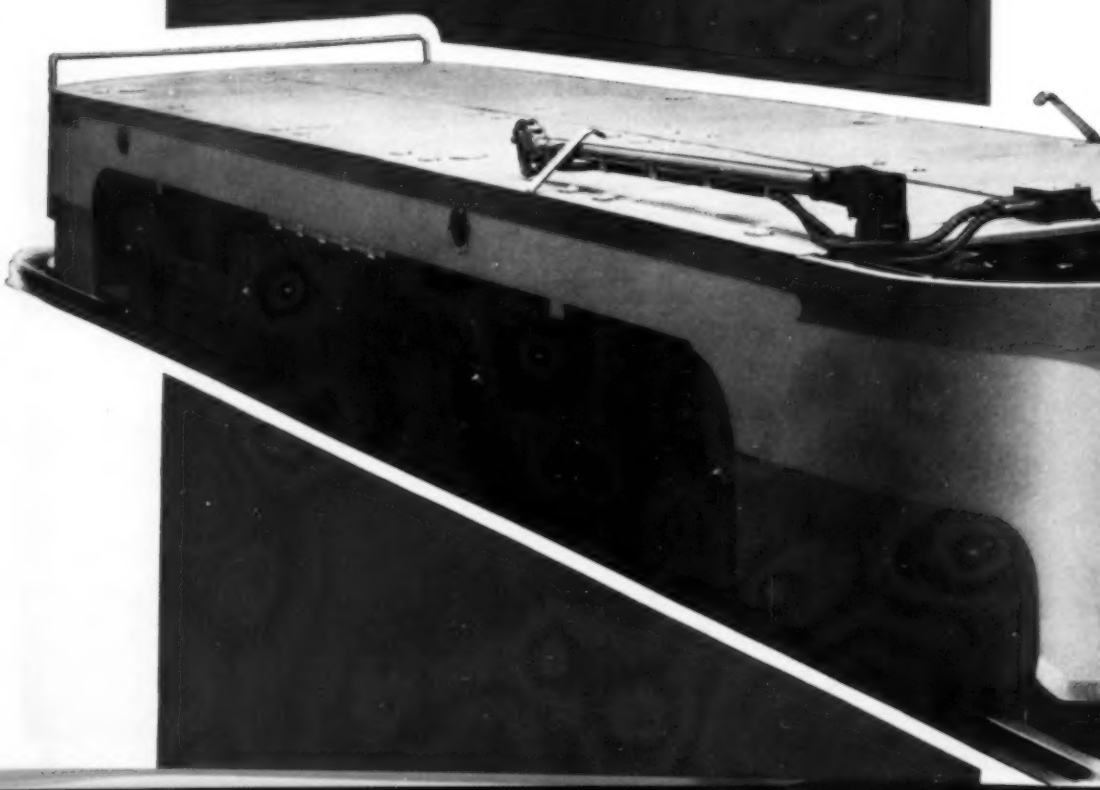
BETTER THINGS FOR BETTER LIVING . . . *THROUGH CHEMISTRY*


power plus!
look inside . . . other features

JEFFREY 25 TON (8-wheel) MAIN LI

with these features:

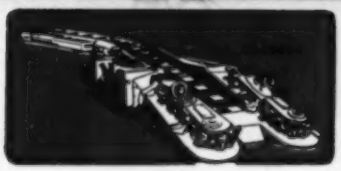
- All-welded Frame
- Will Negotiate a 50-foot Radius Curve
- Four 50 H.P. Ventilated Motors (8 miles per hour) (For 12 m.p.h. operation—120 H.P. motors available)
- Full Electro-pneumatic Contactor Control with Dynamic Braking
- Straight Air Brakes
- Air Sanders for both direction on each truck
- Storage Battery operated Controls and Headlights
- Auxiliary Air Tank for operation of pneumatic motorters in emergency if main Braking is out of order

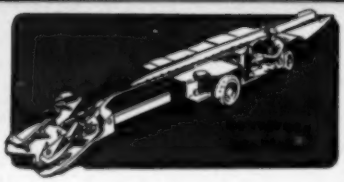


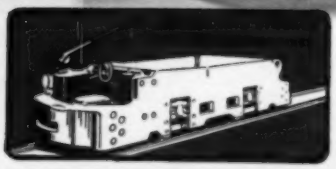
INE LOCOMOTIVES

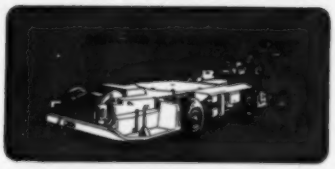


We will be glad to go into more detail about this NEW Locomotive or any of our other sizes. Jeffrey builds a complete line—a type and size to meet your requirements exactly. Gathering or haulage in trolley or storage battery types. Write.

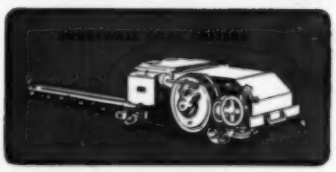


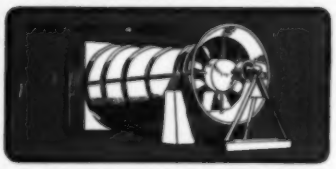


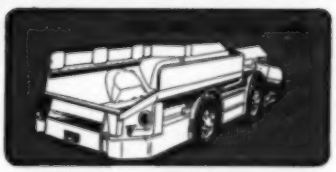


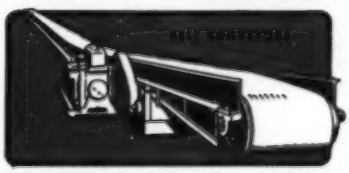


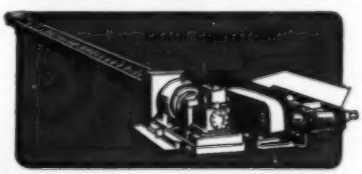












JEFFREY

EQUIPMENT FOR COAL MINES

THE JEFFREY MANUFACTURING COMPANY

Established 1877

General and Export Sales Offices

COLUMBUS 16, OHIO, U. S. A.

DISTRICT SALES OFFICES

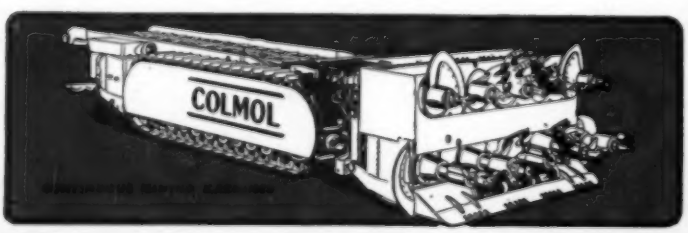
BALTIMORE 2, MD., Munsey Bldg.
BECKLEY, W. VA., 403 City Ave.
BIRMINGHAM 3, 2210 Third Ave., N.
BOSTON 16, 38 Newbury Street
BUFFALO 2, Jackson Building
CHICAGO 1, Bell Building
CINCINNATI 2, Carew Tower
CLEVELAND 15, 1560 Hanna Bldg.
DENVER 2, Ernest & Cranmer Bldg.
DETROIT 13, 5908 St. Jean Avenue
FORTY FORT, PA., 166 Slocum St.
HARLAN, Kentucky
HOUSTON 2, TEXAS, City National Bank Bldg.
JACKSONVILLE 2, Barnett Bank Building
MILWAUKEE 2, 733 N. Water Street
NEW YORK 7, 30 Church Street
PHILADELPHIA 3, Broad St. Station Bldg.
PITTSBURGH 22, Oliver Bldg.
SALT LAKE CITY 1, 101 W. 2nd South St.
ST. LOUIS 1, Railway Exchange Bldg.

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ASSOCIATED COMPANIES

JEFFREY MFG. CO. LTD., Montreal, Canada
BRITISH JEFFREY-DIAMOND LTD., Wakefield, England
JEFFREY-GALION (PTY.) LTD., Johannesburg, S. A.
GALION (GREAT BRITAIN) LTD., Wakefield, England
THE KILBOURNE & JACOBS MFG. CO., Columbus, Ohio
THE OHIO MALLEABLE IRON CO., Columbus, Ohio
THE GALION IRON WORKS & MFG. CO., Galion and Bucyrus, Ohio







This Manitowoc Model 4600, powered by a "Cat" D386 Engine, is one of a pair of "Caterpillar" Diesel powered Manitowoc shovels stripping for Mayo Coal Co., south of Clarion, Pa. Says James A. Mayo: "The only repair on my original 'Cat' D17000 Engine in over 8,000 hours was one set of fuel injectors. This performance and my 'Caterpillar' dealer service record caused me to standardize on 'Caterpillar.' I specified this D386 in my new shovel."

There's a big job ahead

How your equipment takes the beating of the months ahead has a real bearing on America's fight to be strong and stay free. Over half a billion tons of coal, vital to the defense effort, must be mined this year. And we're entering a period that will separate "the men from the boys" in the field of coal mining machinery.

Military needs and Defense Rated Orders are taking their share of "Caterpillar" production. Shortages of steel and other materials add to the difficulty of supplying the demand for new machines. This means that *present equipment must be kept in use.*

"Cat" Diesel Engines, Tractors, Motor Graders and Earthmoving Equipment are built with the stamina to serve you long and faithfully. But *how* long is up to you and the way you operate and maintain them. Good care pays off in longer wear.

You can add many hours to equipment life if you follow sound maintenance practices. Anticipate your parts needs *before* wear goes beyond repair. Talk it over with your "Caterpillar" dealer. He is qualified to give you competent opinion. If a part is not readily available, he has the tools and knowledge to rebuild many worn parts — and keep your machinery on the job.

CATERPILLAR TRACTOR CO. • PEORIA, ILLINOIS

You're the Doctor

Don't let your engine overheat. Maintain the cooling system, keeping it free of scale, rust and sediment. Use soft or treated water and, when freezing temperatures exist, protect your engine with anti-freeze. Clean the radiator periodically, removing foreign matter from the core by brushing or washing. Use chemical flushing solutions. Prevent engine troubles which come with overheating. Consult your Operator's Instruction Book.



CATERPILLAR

Reg. U. S. Pat. Off.

DIESEL ENGINES
TRACTORS
MOTOR GRADERS
EARTHMOVING EQUIPMENT

Dewatering of Fine Coal Pays Dividends



Eimco filtration engineers are available to help in the planning and installation of filtration equipment.

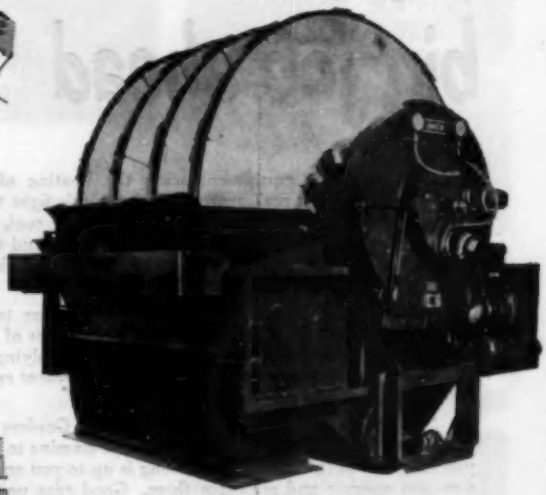
Eimco Vacuum Filters for dewatering coal fines are backed by more than half a century of experience in serving the mining and process industries through the sale and service of heavy-duty machinery. Your Eimco filter is the product of many years of research in many different process industries. In each industry, the success of the EIMCO filters has added to the wealth of experience that makes your EIMCO the outstanding, heavy-duty, trouble-free machine that it is today.

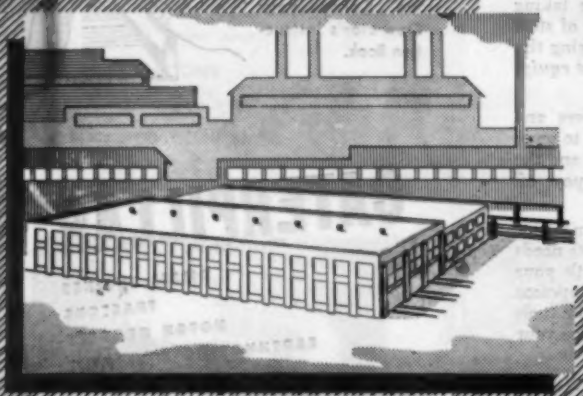
Complete manufacturing facilities at EIMCO provide for the control of all castings and weldments used in the manufacture of EIMCO equipment. Well equipped dealers and service organizations assure the customer of immediate attention on operating problems. EIMCO's fully equipped laboratory, is available to answer customers filtration problems. Write for information on the shipment of samples.



A complete, world-wide service and sales organization, manned by trained technical personnel.

An EIMCO 8' diameter by 4 disc type "AGIDISC" filter specially designed for the dewatering of fine coal. The AGIDISC assures even distribution and drying of the coal fines as well as greater tonnages at lower moisture content.





Complete manufacturing facilities include: iron and steel foundries, steel fabricating shops, machine shops and assembly shops covering approximately half a million square feet of floor space.

EIMCO

A-1246

THE EIMCO CORPORATION

The World's Largest Manufacturers of Underground Rock Loading Machines

EXECUTIVE OFFICES AND FACTORIES – SALT LAKE CITY 10, UTAH, U. S. A.

BRANCH SALES AND SERVICE OFFICES:

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EL PASO, TEXAS, MILLS BUILDING • BERKELEY, CALIFORNIA, P. O. BOX 240
KELLOGG, IDAHO, 307 DIVISION ST. • LONDON W. 1, ENGLAND, 190 PICCADILLY

IN FRANCE: SOCIETE EIMCO, PARIS, FRANCE
IN ENGLAND: EIMCO (GREAT BRITAIN) LTD., LEEDS 12, ENGLAND
AGENTS IN ALL PRINCIPAL CITIES THROUGHOUT THE WORLD



Again in 1951, more tons are hauled

on GOODYEAR tires

than on any other kind!



Road Lug—T. M. The Goodyear Tire & Rubber Company, Akron, Ohio



Only Carlon

THE FIRST REAL PIPE THAT IS PLASTIC!

● FOR YEARS of dependable trouble-free service, specify CARLON plastic pipe. This new means of fluid and vapor transmission combines absolute resistance to rot, rust and electrolytic corrosion with ease of installation to solve pipe maintenance and replacement problems in mines of all types.

ONLY CARLON is unaffected by sulphurous waters, alkalies, metallic salts and other corrosive wastes. It is light in weight, can be handled easily, and has a smooth internal surface that will not accumulate scale.

FLEXIBLE CARLON is produced in all standard pipe sizes and is supplied in long lengths which require fewer fittings per installation and which conform to irregular surface contours as well as slope or entry direction.

A complete line of molded plastic fittings incorporating standard I.P.T. is available for plastic-to-plastic or plastic-to-metal connections.

To obtain the most durable mine pipe available today, specify ONLY CARLON.

At present, raw material shortages are limiting the production of certain types of CARLON pipe. Every effort is being made to overcome this problem and to meet the demand for CARLON . . . the first real pipe that is plastic.

CARLON CP 261-CP

CARLON PRODUCTS CORPORATION

IN CANADA: MICRO PLASTICS, LTD., ACTON, ONT.

10462 MEECH AVE. ● CLEVELAND 5, OHIO

Over half a million mine cars on TIMKEN® bearings!

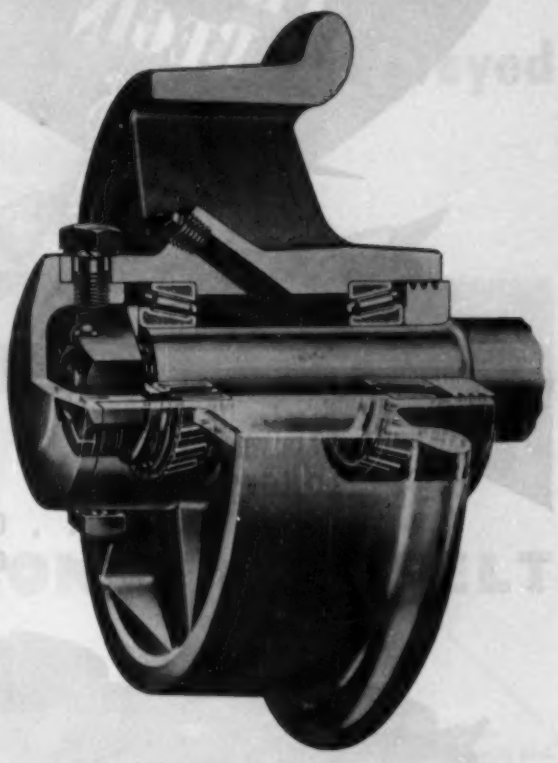
Here are 3 main reasons why

1. MINIMUM MAINTENANCE is the inevitable result of mounting mine car wheels on Timken tapered roller bearings. Simplicity of design, as shown in the mounting at right, provides for easier inspection, assembly and disassembly. Adjustable feature permits operators to obtain maximum life from the bearings—dust collar makes periodic lubrication more effective.

2. GREATER LOAD CAPACITY is found in Timken bearings because loads are carried on line of contact between rollers and races. Case hardened Timken fine alloy steel provides bearing parts with a tough shock-resistant core and a hard wear-resistant surface. And because Timken bearings carry both radial and thrust loads in any combination, no special thrust washers or thrust bearings are needed.

3. ECONOMY OF OPERATION results when cars are equipped with Timken tapered roller bearings. True rolling motion and the incredibly smooth surface finish of Timken bearings keep friction to a minimum — permit more cars per locomotive or less power for hauling the same number of cars.

For minimum hauling cost per ton insist on Timken bearings for your car wheels.



CUT YOUR COSTS BY SPECIFYING

TIMKEN
TIMKEN-HYATT REG. U. S. PAT. OFF.
TAPERED ROLLER BEARINGS

The Timken Roller Bearing Company, Canton 6, Ohio. Canadian Plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

NOT JUST A BALL ○ NOT JUST A ROLLER ▭ THE TIMKEN TAPERED ROLLER ▭ BEARING TAKES RADIAL ◐ AND THRUST ⊣◐⊢ LOADS OR ANY COMBINATION ✳

THIS IS THE POINT WHERE PROFITS BEGIN

YOU'LL FIND YOUR GREATEST ECONOMY IN BOWDIL BITS



HELD BY THE LONGEST LASTING CHAIN . . . . . ON THE STRONGEST CUTTER BAR MADE



BOWDIL

COAL CUTTING EQUIPMENT

CANTON OHIO



Lower Cost per Ton Conveyed

Homocord CONVEYOR BELT

"Costs less, because it lasts longer . . ."

That's the way users look at Homocord.

And it's not just luck that makes it last longer . . Homocord is designed from the "heart" out specially and only for conveyor belt use.

It has extra cushion, extra troughability, extra draw-bar strength — the qualities a belt must have to last longer under the heavy impact loading of big lumps, long hauls of modern mining, quarrying and earth moving.

Bulletin 6906 tells more of the technical advantages of Homocord Conveyor Belts. We'll mail you a copy on request.

Our hose, V-belts and flat belts are also designed to lower your costs. Your R/M Representative tells you how.

MANHATTAN RUBBER DIVISION — PASSAIC, NEW JERSEY

RAYBESTOS-MANHATTAN, INC.

Manufacturers of Mechanical Rubber Products • Rubber Covered Equipment • Radiator Hose • Fan Belts • Brake Linings • Brake Blocks • Clutch Facings • Packings • Asbestos Textiles • Powdered Metal Products • Abrasive and Diamond Wheels • Bowling Balls

Your boom support costs can be cut in half with



Vibration is effectively dampened here. Note how the interwoven end dampens vibration over a long section of rope instead of concentrating it at one point.

What does it cost you to replace a boom support? Figure the actual cash outlay, the lost production, labor, etc., and you'll quickly see the advantages of these new Fatigue Resistant Tiger Brand Cable Assemblies which ensure 2 to 3 times longer life.



these new Fatigue Resistant TIGER BRAND Cable Assemblies

An exclusive development of AMERICAN STEEL & WIRE COMPANY

Why these boom supports last 2 to 3 times longer. Excessive vibration is the chief cause of boom support failure. In old style boom supports, vibration is concentrated at the *point* where the rope enters the socket. This causes the wires to break from fatigue. In this new assembly, the effects of vibration are dissipated over a long section instead of being concentrated at one point. The result is two to three times longer life for boom supports and much greater safety.

The new Tiger Brand Assembly has a novel design which embodies *interwoven* eye-end and open-end thimbles which makes these pendants easily and quickly interchangeable on standard equipment.

You also save replacement time. If the machine is down for two or three hours while new boom supports are being installed, you lose that much production time. Longer life from our new supports *results* in fewer replacements. This means clear profit if you use the new Tiger Brand Supports.

Order your next boom supports now. The new Fatigue Resistant Boom Supports can be easily and quickly adapted to your present equipment because essential dimensions such as pin diameters, distances between ears, etc. are the same as for standard open and closed sockets. Send the coupon for complete information.

AMERICAN STEEL & WIRE COMPANY,
GENERAL OFFICES: CLEVELAND, OHIO
COLUMBIA STEEL COMPANY, SAN FRANCISCO
TENNESSEE COAL, IRON & RAILROAD COMPANY, BIRMINGHAM,
SOUTHERN DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

American Steel & Wire Company
Rockefeller Building, Dept. 1-9
Cleveland 13, Ohio

Please send me complete information on your new Tiger Brand Boom Support Assemblies.

Name.....

Title.....

Company.....

Address.....

City..... State.....

USS

AMERICAN TIGER BRAND WIRE ROPE

Excellay Preformed

UNITED STATES STEEL



. . the Vulcan Delayed-Action Safety Device

Experienced mining men know how desirable it is that automatic application of the brakes on a slope-hoist drum should be delayed until the upward momentum of the trip has stopped and it begins to move back. Accumulation of slack is thereby prevented—eliminating danger of over-running the rope, or of breaking it if the trip falls back rapidly enough to take up the slack with a sudden jerk.

The Vulcan Delayed-Action Safety Device supplements the well-known Vulcan Dead-Weight Safety Device so that—when the electric power fails, or is cut off by action of either the overspeed governor or the travel-limit control—the magnet plunger falls only a fraction of an inch before coming to rest on a small revolving drum. This drum is chain geared so that its rotation is synchronized with that of the hoist drum, and the magnet plunger is so hinged that it cannot complete its fall while the small drum is revolving toward it. When the drum has turned back a quarter of a revolution, however, the magnet plunger does complete its fall; thereby loosening the latch which supports the heavy "dead weight" and automatically applying the brakes.

As indicated by the illustration above most new Vulcan slope hoists are now equipped with this device but our engineers also welcome opportunities to promote safer operation by submitting plans and specifications for its application to slope hoists already in service.

NOTE: Illustration above shows the Delayed-Action Safety Device applied to a 350 hp. Vulcan Slope Hoist with hand-operated brakes. It is equally applicable, however, to our larger hoists having brake engines operated by either air or oil-hydraulic pressure systems. Write for Bulletin A-487.

VULCAN IRON WORKS

Established 1849

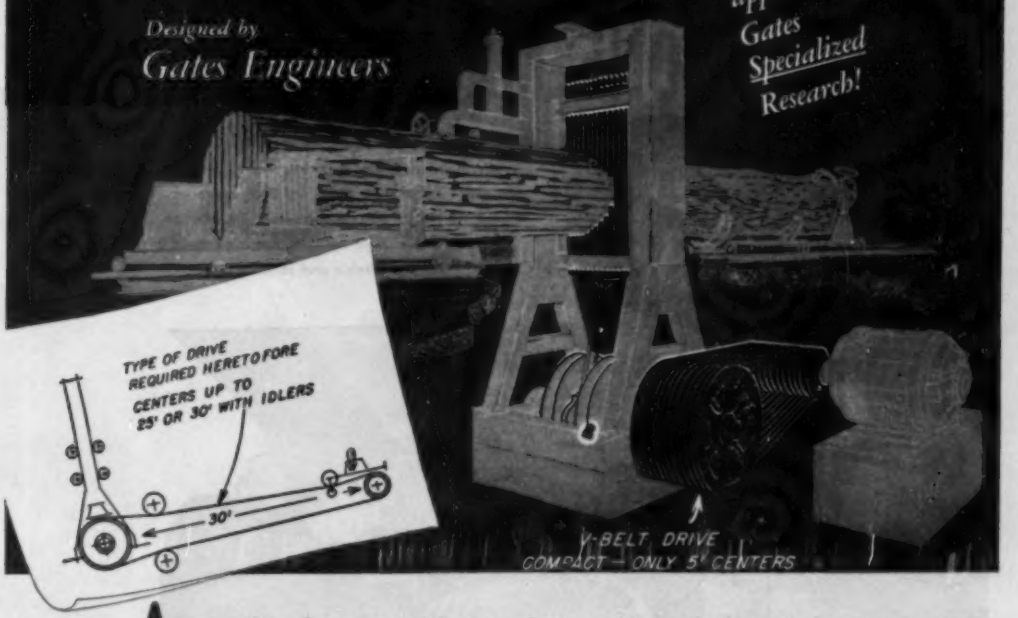
Main Office and Works WILKES-BARRE, PA., New York Office 50 Church

Heavy-Duty Electric Hoists	Shaking-Chute Conveyors	Steam Locomotives	Lead-Carrying Lorries
Self-Contained Hoists	Chain Conveyors	Diesel Locomotives	Rotary Kilns, Coolers and Dryers
Scraper Hoists	Cast-Steel Sheaves and Gears	geared and electric drive	Briquetting Machines
Car-Spotting Hoists	Cages, Skips and Gunboats	Gasoline Locomotives	Steel Castings
Room Hoists	Electric Mine Locomotives	geared and electric drive	Heavy Special Machinery

The first successful V-Belt Drive for GANGSAWS

Another practical application of Gates Specialized Research!

Designed by Gates Engineers



A large maker of gangsaws said to Gates Engineers, "If you can design a V-Belt drive to handle the *fluctuating load* on a gangsaw, we can discard the long and troublesome flat belt that we have always thought we had to use."

The *reasons* for his statement are quickly told:—

A gangsaw (or Swedish type Gang Mill) consists essentially of several saw blades mounted in a heavy steel frame or "sash" that moves rapidly up and down like a monster jig saw. This sash may weigh a ton or more—yet it makes about *five* 24-inch *up* and *down strokes per second!*

On the *up* strokes, the saws have no cutting load on them. But on the *down* strokes they must often slash a log up to 36" diameter into 2" planks. This great unbalance in load between the *up* and the *down* strokes has heretofore defeated all efforts to apply a V-Belt Drive to saws of this type.

After thoroughly analysing the fluctuating load on gangsaws, Gates Engineers recommended very minor changes in design which would permit the application of V-Belts and—what is of *utmost importance to you*—they were able to write down *in advance* the exact specifications of the V-Belt Drive that has very successfully handled this extremely difficult assignment.

This *pre-solution* of drive design problems is possible because Gates operates the largest V-Belt testing Laboratories in the World—and Laboratory findings are carefully checked by tests made under actual field conditions. Finally, the *results* of these exhaustive tests are immediately reduced to *usable data* for the design of V-Belt drives to *perform whatever task may be required.*

Phone a Gates Field Engineer

If you have a difficult drive to design, or if some drive in your plant is giving trouble, or if you only want to be sure what size and construction of V-Belts will give the most efficient and the lowest cost service on any particular drive—you have only to phone a Gates Field Engineer, *always near you* in all industrial centers.

Just look in your phone book under "Gates Rubber." A Gates Field Engineer will come right to your plant and put at your service the full benefits of Gates V-Belt knowledge and experience *without the slightest obligation!*

ENG. 515

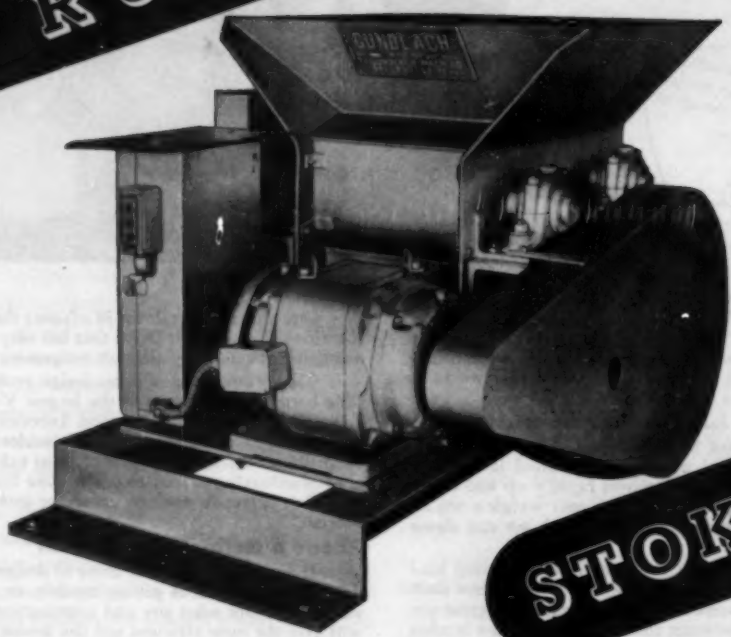
Gates
Hose V-Belts
Molded Rubber Goods

VULCO ROPE DRIVES
ENGINEERING OFFICES AND JOBBER STOCKS
IN ALL INDUSTRIAL CENTERS

FROM MINE RUN TO STOKER COAL WITH "Two Stage" CRUSHING IN ONE MACHINE!

MINE RUN

The GUNDLACH *"Two Stage"* Coal Crusher incorporates two crushing stages in one machine and is designed to reduce RUN-OF-MINE to STOKER COAL in ONE operation. Compact design simplifies structural supports and installation. Rugged simple construction combined with engineering proved in the field makes this machine a profitable and reliable unit.



STOKER

- Crushing rolls are STEEL, hard faced and balanced.
- All gears are steel cut; Timken roller bearings used throughout.
- Furnished with electric, gasoline or diesel power unit.
- Weight approximately two tons. Height 42" Width 47" Length 6'3" (Electric power unit)

Fulfilling an urgent need in the industry, the GUNDLACH *"Two Stage"* Crusher has delivered over 85% usable stoker coal from an Illinois mine run lot.

WRITE DEPT. MI FOR COMPLETE DETAILS AND CRUSHER BULLETIN GC-2.

T. J. GUNDLACH Machine Co., Belleville, Ill.

"With GULF CAM GREASE

we've eliminated 28 grease applications per shift"

_____ says this General Tipple Foreman



"We can't say too much for Gulf Cam Grease," says this General Tipple Foreman, "with the ordinary lubricant we formerly used we had to grease these cams every 15 minutes. Now with Gulf Cam Grease we lubricate only once every two hours and get better protection, too. That means 5 applications a shift instead of 33. We've been able to cash in on this time saver, because we can now put the greaser to work on other jobs."

This is typical of the outstanding results obtained with Gulf Cam Grease in scores of breakers and preparation plants. Here's why it's so effective for shaker screen eccentric straps and other grease lubricated bearings:

Gulf Cam Grease has a high dropping point—it doesn't leak out even at high operating temperatures. Because it is stable at these high temperatures, it does not separate or oxidize appreciably. And unlike most high-temperature lubricants, Gulf Cam Grease is effective when wet conditions prevail.

With Gulf Cam Grease you'll make fewer bearing replacements, avoid lubrication troubles, and reduce maintenance costs. Why not give it a trial in your tipple bearings. For further information, call in a Gulf Lubrication Engineer. Write, wire, or phone your nearest Gulf office. Gulf Oil Corporation · Gulf Refining Company, Gulf Building, Pittsburgh 30, Pennsylvania.

FIFTY YEARS OF SERVICE
1901 GULF 1951
PETROLEUM AND ITS PRODUCTS





DEPENDABLE

under severest conditions of dust and dirt!

DODGE-TIMKEN

- Even under layers of grime, dirt and abrasive dust encountered in many production operations, the Dodge-Timken Type C bearing carries its power load smoothly, efficiently, without interruption—because it's
- Triple-sealed to prevent the entry of dust, however fine. Accurately machined steel seals keep dirt *out* and lubricant *in*.
- Dodge mounts, seals, houses Timken precision bearing units in rugged assemblies (four different types) to deliver a minimum of 30,000 hours uninterrupted service.
- Dodge Timken Type C Pillow Blocks are fully self-aligning, with both radial and thrust carrying capacity.
- Delivered fully assembled, adjusted and lubricated, ready to lock on shaft. Locking collars at both ends insure firm fastening.
- Normally available from Dodge Distributors' stocks, sizes from 1-7/16" to 4-15/16".



DODGE MANUFACTURING CORPORATION, 3000 Union Street, Mishawaka, Indiana

DODGE

of Mishawaka, Ind.

CALL THE TRANSMISSIONEER, your local Dodge Distributor for assistance on new, cost-saving methods. Look for his name under "Power Transmission Equipment" in classified phone book.

FIRST IN POWER TRANSMISSION MACHINERY!



V-BELTS AND TAPER-LOCK SHEAVES



TORQUE-ARM SPEED REDUCERS



ROLLING NUT AND DIAMOND V CLUTCHES



SOLID STEEL CONVEYOR PULLEYS

"What's Cookin'" on the other side of the mountain?



WHEN a locomotive engineer heads his train into a miles long tunnel under a mountain he wants to be reasonably sure that the track is clear not only in the tunnel but on the other side too. Frequently the only way he can get that information is through signal systems. When they are sitting on a siding signal cables may not look like much but once they are installed and connected they are a most important piece of equipment to a locomotive engineer.

Railroad Signal Cables carry a heavy burden of responsibility for the safety of passing trains. For that reason Railroad Signal Engineers are more often than not apt to be very "choosy" about the kind of signaling equipment they buy and install. More and more these days you will see Simplex-ANHYDREX Signal Cables like these being installed by railroads all over this country.

These cables are installed underground and overhead, in tunnels or in bright burning desert sunlight, on signal bridges across busy terminal tracks or buried in the slime and mud of swampy land. Why this trend to ANHYDREX Signal Cables? Because they are dependable. Regardless of the operating conditions if they are properly installed ANHYDREX Signal Cables will operate dependably year in and year out.

If you have a power, signal or control cable problem we will be glad to discuss it with you and make recommendations based on nearly seventy years experience.



SIMPLEX-ANHYDREX

SIMPLEX WIRE & CABLE CO. 79 SIDNEY ST. CAMBRIDGE 39 MASS

B.R.A.

Purchasing-

Our supply of spikes getting low. Hope you buy from Bethlehem again. Their spikes have sharp points- are easy to drive - give good service.

McKeen



Look for the "A" on the head.

BETHLEHEM STEEL

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

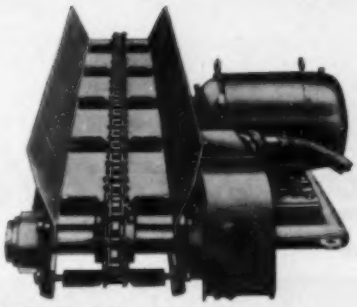
Other Bethlehem Fasteners for the Mine

TRACK BOLTS • RIVETS • ROOF BOLTS AND ACCESSORIES • STANDARD BOLTS AND NUTS • THREADED RODS

Better Engineered

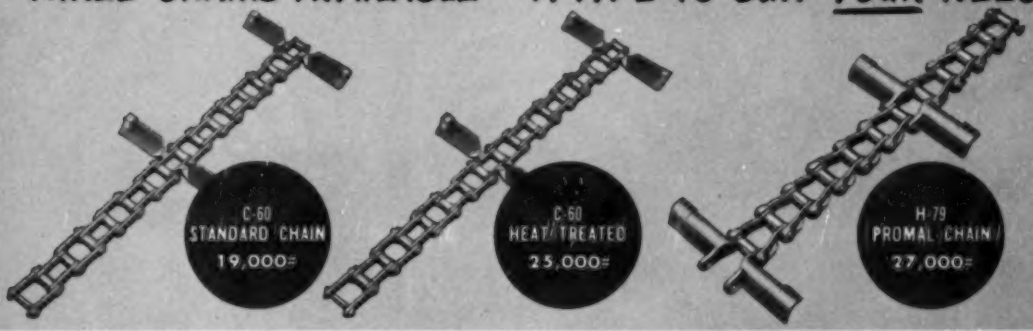
CHAINS

. . . Another of the many reasons why there's nothing on the market to match the



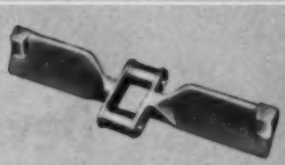
JOY MODEL FA ROOM CONVEYOR

THREE CHAINS AVAILABLE — A TYPE TO SUIT YOUR NEED





C-60 Chain Parts Showing Double Lock on Chain Pin



Flight for C-60 Standard or Heat-Treated Chain



Flight for H-79 Promal Chain

The Model FA is the last word in Chain Conveyors. It not only brings you the advantages of simple V-belt drive, more efficient speed reducer, 500 lbs. less weight, 4 sq. ft. less base area, and easy reversibility. In addition, three new Joy-engineered chains are available: the C-60 with malleable block links (19,000 lbs. ultimate strength); the C-60 fully heat-treated (25,000 lbs. strength); and the H-79 Promal heat-treated pintle-type chain, which has an ultimate strength of 27,000 lbs.

All three chains have drop-forged flights integral with the link. The H-79 is also available with a detachable flight. Other superior features of FA Conveyors include an exclusive, non-jamming gravity take-up for the chain, and a ball-bearing mounted shear-pin sprocket which continues rotating and cannot damage either the head-shaft or the sprocket bore if the pin shears. ● *Write for Bulletin LD-200.*

Consult a Joy Engineer



WOD CL 3909

JOY MANUFACTURING COMPANY

GENERAL OFFICES: HENRY W. OLIVER BUILDING · PITTSBURGH 22, PA.

IN CANADA: JOY MANUFACTURING COMPANY (CANADA) LIMITED, GALT, ONTARIO

Progress Report on the JOY

SIZE	SIX CUTTER CHAINS CHANNEL LACING	ROTARY DRUM HEAD	REMARKS
	PER CENT	PER CENT	
+ 6" sq.	3.14	4.73	Sizes above 1 inch increased 55%
6" x 2" sq.	11.49	16.52	
2" sq. x 1" sq.	12.33	19.80	
1" sq. x ½" sq.	19.04	17.28	
½" x 5/16 sq.	8.28	6.19	Sizes below ½ inch reduced 22.5%
5/16 sq. x 8 M.	21.64	17.05	
8 M. x 10 M.	4.28	3.37	
10 M. x 48 M.	12.65	9.82	
48 M. x 200 M.	4.32	3.24	
—200 M.	2.83	2.00	
TOTAL	100.00 NOVEMBER 28, 1950	100.00 DECEMBER 12, 1950	

Tests of New Ripping Development Show *22% less fines* in Average Production

There is not a single machine of Joy manufacture which is not subject to constant research study, engineering development and change. We consider that endless search for improvement is our primary obligation to the mining industry.

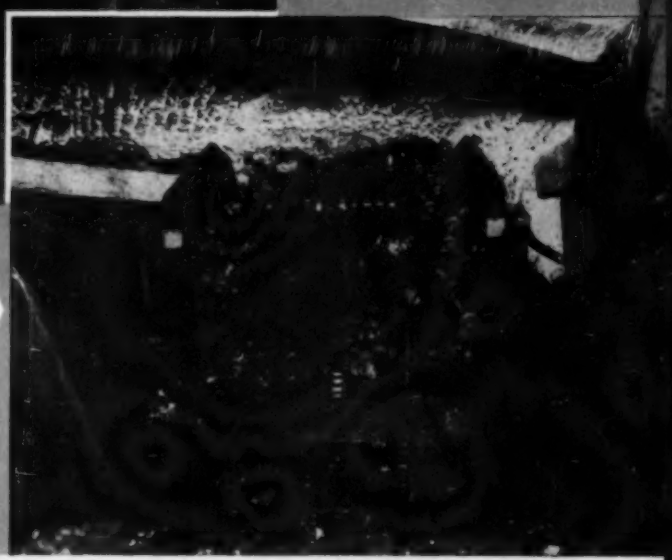
An important forward step of this nature has now taken place in the Joy Continuous Miner, with the development of a new rotary drum type of ripping head. This rotary head has been in operation underground in the Illinois No. 6 seam, and in the Pittsburgh seam in West Virginia. One of the earlier size consist studies is shown above, comparing the rotary drum head with the original 6-chain head. These favorable results have been fully confirmed by all later tests.

The reduction of more than one-fifth in the coal produced in sizes below ½ inch, with the accompanying large increase in sizes above 1 inch, is a major point, of course. But several other marked advantages have been secured as well, such as: greatly reduced overall maintenance, approximately one-quarter less power consumption, vastly increased bit life and reduced bit cost—all without any sacrifice of tonnage.

CONTINUOUS MINER



A Joy Continuous Miner with the new rotary drum head is shown here in operation in the Pittsburgh seam. Power requirements for the machine are reduced 20 to 30% with the rotary head, providing less load throughout the drive, transmission and control units, and—combined with other improvements in design and materials—assuring a major improvement in overall machine performance.



View of the same machine, looking toward the face from approximately the operator's position, and showing considerable large lump production. The new rotary head contains only about half the number of bits used in the 6-chain head, and in addition, bit life has actually been increased 4 or 5 times. Overall head maintenance is estimated as 40 to 50% less than with the 6-chain head.

Consult a Joy Engineer



JOY MANUFACTURING COMPANY

GENERAL OFFICES: HENRY W. OLIVER BUILDING · PITTSBURGH 22, PA.

IN CANADA: JOY MANUFACTURING COMPANY (CANADA) LIMITED, GALT, ONTARIO





JOY SULMET BITS

PROVE AGAIN THEY'LL CUT YOUR COSTS

CONDITIONS

Comparative performance of Joy Sulmet Type SM Bits and two other makes of tungsten carbide bits on a Joy Continuous Miner. Seam about 96" thick—hard firm coal with a 1" or 2" rock parting, normally about 2 ft. from the top. Occasional sulfur intrusions in the coal; in general, fairly hard cutting.

RESULTS

	Joy SM Bits	Bits B	Bits C
Tons mined in test.....	8113	7873	9145
Comparative Bit Cost per ton, including grinding and setting.....	Low	8.8% higher	77.0% higher

The figures above demonstrate once more that Joy Sulmet Bits are best for the Continuous Miner, as well as for cutting machines of all types—a superiority well established in many different mining areas and under widely varying conditions. The exclusive Joy design, with a protective cap over the tungsten carbide insert, results in fewer broken bits and eliminates lost inserts.

Write for Bulletin, or *Consult a Joy Engineer*



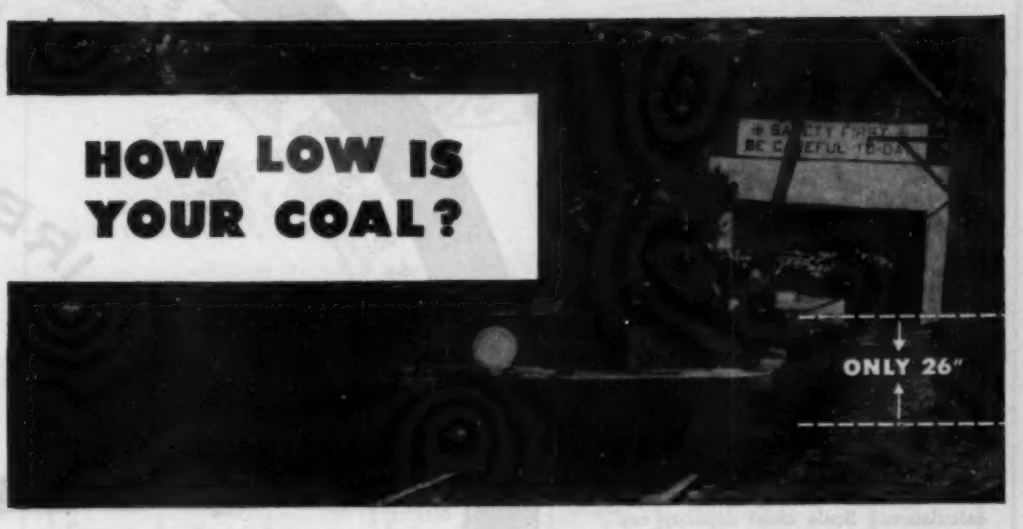
WBD CL 9518

JOY MANUFACTURING COMPANY

GENERAL OFFICES: HENRY W. OLIVER BUILDING · PITTSBURGH 22, PA.

IN CANADA: JOY MANUFACTURING COMPANY (CANADA) LIMITED, GALT, ONTARIO

YOU CAN BE **SURE**.. IF IT'S
Westinghouse



Get More Low Coal Per Man-Hour With the 15-Ton Low-Liner

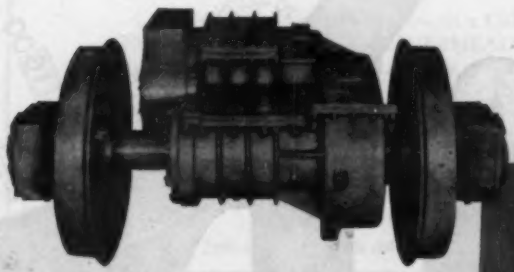
Speed high-tonnage output from low veins with the 15-ton "Main Haulage" LOW-LINER. Only 26" high, it goes in veins inaccessible to conventional heavy-duty locomotives—reduces unproductive "clearance" excavation. Powered by two 90-hp motors, it hauls loads up to 9 mph at 7,500 lbs. drawbar pull . . . can be operated in tandem for greater capacity. Motors have high continuous rating. Electropneumatic control simplifies handling.

Flush-frame construction increases safety and provides ample equipment space. The flat top affords greater visibility, better clearance to the top of the mine. All parts are arranged for easy access. The Low-Liner also embodies many other design features which contribute to reliable performance and economical haulage.

CHECK THESE DIMENSIONS:

Height	26"	Gauge	44"
Width	78½"	Wheel Base	85"
Length	21' 2"	Wheel Diameter	24"

For full details, call your Westinghouse office, or write Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pennsylvania. J-15159



What Makes the Low-Liner Low

Small-diameter motors with parallel spur gearing mounted in a common casting—plus smaller wheels—cuts over-all height to a 26" *low.*

Westinghouse
MINE LOCOMOTIVES

READING TIME:

Instantly!

STOP profit-eating weighing losses . . . speed and simplify your weighing operations . . . minimize the chance for human error. Those are the important cost-advantages you get with Fairbanks-Morse Dial Scales and the unique *Direct Reading* principle.

Weights are read right at the point of the indicator . . . *instantly* without mental calculations. Scale chart capacity can be increased as much as 5 times *without increasing basic chart graduations* . . . an exclusive Fairbanks-Morse advantage made possible by the Direct Reading Principle. With ordinary scales, the weigh man must mentally add to indicated weight . . . materially increasing the chance for error . . . substantially delaying operations. Fairbanks-Morse Direct Reading Dials provide the easy, fast, accurate way to weigh!

Your Fairbanks-Morse weighing expert will be happy to give you the complete story on this or any of the other lastingly accurate Fairbanks-Morse Scales. Fairbanks, Morse & Co., 600 South Michigan Avenue, Chicago 5, Illinois.

FAIRBANKS-MORSE,

a name worth remembering

SCALES • PUMPS • ELECTRIC MOTORS • GENERATORS
LIGHT PLANTS • DIESEL, DUAL FUEL AND GASOLINE
ENGINES • DIESEL LOCOMOTIVES • MAGNETOS



Fairbanks-Morse Direct Reading Cabinet Dials can be equipped with Printomatic Recorders where accurate, printed records of weights are desired.

Heyl & Patterson Can Do a *Better Job*

at a *Lower Cost* to you!

The Heyl & Patterson
One Overhead . . . One Profit Way

PROFIT			
OVERHEAD			
OUR OWN Engineering Department	OUR OWN Structural Work	OUR OWN Machine Work	OUR OWN Erection

In Contrast With Other
Many Overheads . . . Many Profits Way

PROFIT	PROFIT	PROFIT	PROFIT
OVERHEAD	OVERHEAD	OVERHEAD	OVERHEAD
PROFIT	PROFIT	PROFIT	PROFIT
OVERHEAD	OVERHEAD	OVERHEAD	OVERHEAD
Engineering Department	Structural Work	Machine Work	Erection

The Low Cost Odds are all in your favor when you deal with a company that has THEIR OWN COMPLETELY OWNED AND OPERATED FACILITIES.

Heyl & Patterson can guarantee "CONTROLLED QUALITY" because we have OUR OWN Engineering Department, OUR OWN Structural Shop, OUR OWN Machine Shop and OUR OWN Erection Department.

Heyl & Patterson can guarantee "CONTROLLED LOW COST" because every phase of any Heavy Bulk Materials Handling Equipment Job can be produced entirely within our organization.

Consider the advantages to you on a Coldly Calculated Cost Basis of . . . ONLY ONE WRITE-UP . . . ONE OVERHEAD . . . ONE PROFIT. This is and always has been the Heyl & Patterson Way.

Ore Bridges
Railroad Car Dumpers } High Lift-Turnover-Rotary
Coal Preparation Plants
Coal & Coke Handling Equipment
Boat Loaders and Unloaders
Rotary Mine Car Dumpers
Coal Crushers
Coal Storage Bridges
Car Hauls and Boat Movers
Bradford Breakers
Refuse Disposal Cars
Thorsten Coal Sampling Systems
Kinney Car Unloaders
Pig Iron Casting Machines
Cyclone Thickeners
Thermal Dryers
The Drying Dutchman } Roineveld Centrifugal Dryer

Heyl+Patterson, Inc.
"SINCE 1887"

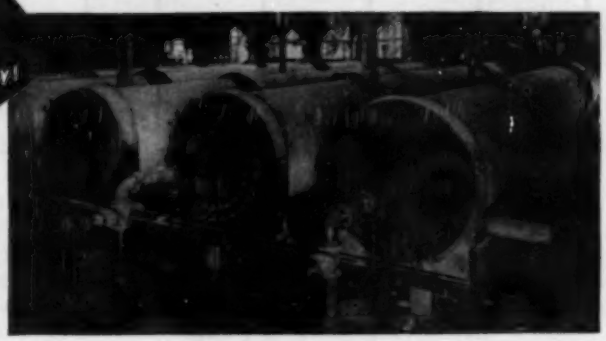
Heavy Bulk Materials Handling Equipment
All The Way from Design to Erection

55 WATER STREET • PITTSBURGH 22, PA.

See Louisville for
CREATIVE
DRYING
ENGINEERING

LOUISVILLE DRYERS
pay their way

KNOW THE
RESULTS
Before You Buy!



Savings sometimes can't be evaluated in dollars but they are there just the same.

A large company decided to investigate the possible advantages of refining a mined product at its source instead of hundreds of miles away. The purpose was to eliminate considerable freight on water as well as shipping a great quantity of unusable material.

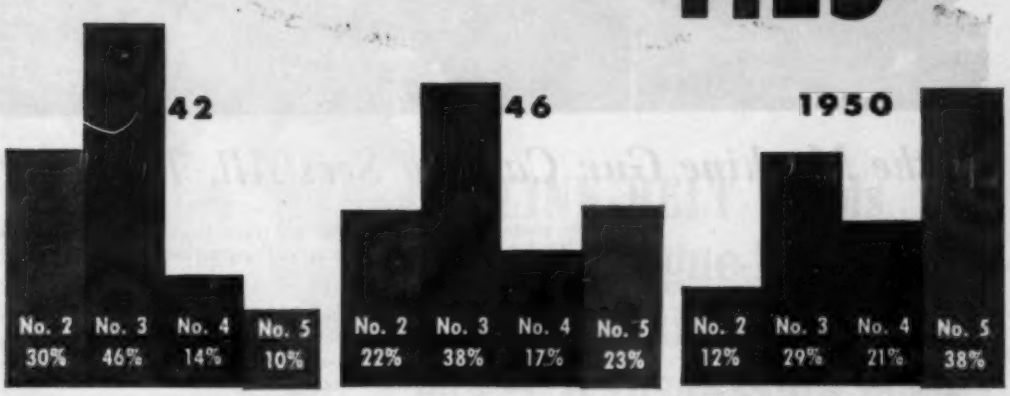
A process was developed which greatly reduced the amount of rejects but it required unusually careful handling in the drying. The problem was presented to a Louisville Drying specialist. The correct answer was found in Louisville's unique research and development laboratory. The full-size installation was designed and installed with confidence of complete success—because it was proven correct in advance in Louisville's pilot plant.

Obsolete methods may be reducing your profits. Ask for a Louisville engineer to survey your drying processes. There's no obligation.

Other General American Equipment:
Turbo-Mixers, Evaporators, Thickeners, Dewaterers, Towers, Tanks, Bins, Filters, Kilns, Pressure Vessels

Louisville Drying Machinery Unit
Over 50 years of creative drying engineering
GENERAL AMERICAN TRANSPORTATION CORPORATION
Dryer Sales Office: Huffman Bldg., 139 So. Fourth Street
Louisville 2, Kentucky
General Offices: 135 South La Salle Street, Chicago 90, Illinois
Offices in all principal cities

The Swing is to HEAVIER TIES



Relationship between tonnages of Bethlehem 2 3, 4, and 5 steel ties sold in three different years.

Shown here are comparative percentages of the Bethlehem Nos. 2, 3, 4, and 5 steel ties sold during the years 1942, '46, and '50. (The charts are based on tonnage.) It's apparent at a glance that the No. 5 tie, heaviest of the group, rose from last place to a good, strong first in the space of eight years.

We show 1942 as a starting point because at that time the No. 5 was still new and hadn't gathered much momentum. Not many mine operators were convinced that they needed heavy ties. But by 1946, four years later, No. 5's accounted for almost a quarter of our tie tonnage sold during the year. And by 1950, the No. 5 was the undisputed leader.

This definite trend confirms our belief that in modern mining heavy ties will do the best, most economical job. Bethlehem's No. 5 offers convincing proof. Weighing five pounds per foot, it stands up for long periods under the staggering loads of today's cutters, loaders, and motors. It can be taken up and reused many times. It's the steel tie that puts strength under rails . . . the tie that gives a sturdier, safer track structure.

Write for the facts. They're especially interesting if the loads in your mine are growing heavier each year.

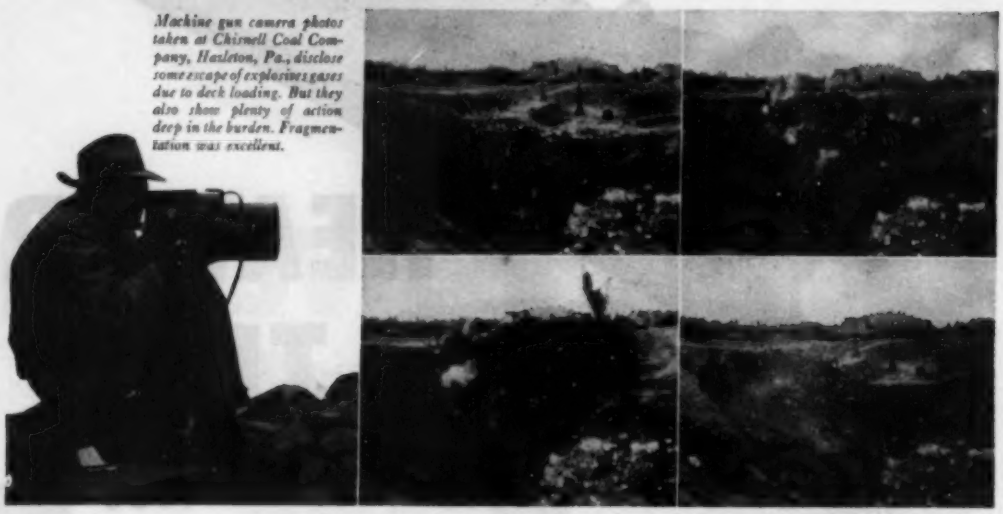
BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

★ BETHLEHEM STEEL ★

What Really Happens When a Blast Is Shot?

Machine gun camera photos taken at Chisnell Coal Company, Hazleton, Pa., disclose some escape of explosives gases due to deck loading. But they also show plenty of action deep in the burden. Fragmentation was excellent.



...the Machine Gun Camera Sees All, Tells All!

Like the photo-finish camera at the race track, the machine gun camera with its big lens and rapid shutter makes a "stop-action" record of what the human eye can't follow.

The machine gun camera automatically snaps three photos a second on five-inch film. It sees all and tells all about what *really* happens when a blast is shot. Now, Atlas can show you proof in pictures of what the ROCKMASTER Blasting System actually does for blasters.

Atlas technical men use the machine gun camera to "freeze" the action of blasts in quarries, strippings, and construction jobs. They have caught as many as 42 pictures of a single blast—a photo sequence that tells exactly what happens from the instant of detonation till the dust settles.

Your Atlas representative will be glad to show you the picture presentation of the ROCKMASTER story. He will show you through the eye of the machine gun camera how you can profit by using the correct numbers of the sixteen ROCKMASTER milli-second delay detonators teamed with the ROCKMASTER system of explosives choice and loading methods.



For a preview of the ROCKMASTER *Machine Gun Camera Presentation, send for this free booklet.*

ROCKMASTER: Reg. U. S. Pat. Off.

ATLAS EXPLOSIVES *"Everything for Blasting"*

CHEMICALS ATLAS EXPLOSIVES

ATLAS POWDER COMPANY, Wilmington, Del. • *Offices in principal cities* • *Cable Address—Atpowco*

LINK-BELT RESEARCH AND ENGINEERING WORK FOR INDUSTRY



LINK-BELT builds extra fatigue-life into roller chain . . . to cut power transmission costs

LINK-BELT has worked hand-in-hand with America's manufacturers since 1875 to step up production

MODERN production requires positive, efficient drive and conveyor chains. Yet these chains must also be resilient enough to withstand repeated shock loads. And their ultimate cost must be low.

Link-Belt Precision Steel Roller Chain meets every requirement. Its high-strength and low-maintenance advantages mean years of trouble-free service.

For continuous Link-Belt research has developed—in addition to shot-peened rollers—other extra-wear features. For example, a special process, of value on a range of sizes, eliminates a common cause of stiff chain. And the chain receives a dramatic increase in service life, thanks to special metallurgical factors and manufacturing steps.

This is another example of Link-Belt research, engineering and production ingenuity. You'll find hundreds of Link-Belt products at work throughout industry . . . helping make America more productive. 22.423-A

LINK-BELT

One Source . . . One Responsibility for Materials Handling and Power Transmission Machinery

LINK-BELT COMPANY: Chicago 9, Philadelphia 40, Pittsburgh 13, Wilkes-Barre, Huntington 9, W. Va., Louisville 2, Denver 2, Kansas City 8, Mo., Cleveland 15, Indianapolis 6, Detroit 4, Birmingham 3, St. Louis 1, Seattle 4, Toronto 8, Springs (South Africa).

A LOW COST *Mining Method*



CARDOX HARDSOCG *Underground* MINING-DRILL

Mining-Drill in operation. The illustration shows an auger chuck on each side of the final output drive. These two chucks provide for operation in either direction.

If you have the problem of hard-to-mine coal, check with us! Ask to have a CARDOX engineer show how you can profitably use the Cardox-Hardsocg Underground Mining-Drill.

HARDSOCG DIVISION

CARDOX CORPORATION

307 N. MICHIGAN AVE. • CHICAGO 1, ILLINOIS

for HARD-TO-MINE COAL

● Here's a drill that qualifies as a continuous-miner for areas formerly judged too costly to work. It helps you to mine coal profitably that, otherwise, you would be compelled to leave in the ground.

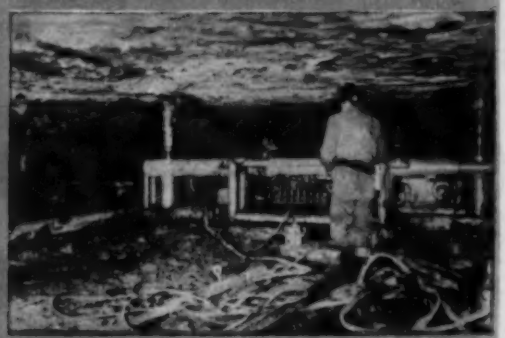
The Cardox-Hardsocg Underground Mining-Drill is a perfect answer to poor roof conditions—particularly where timbering costs make it impossible to remove coal in a conventional manner. Men are enabled to work in safety within areas where the roof can be supported at reasonable cost. It is the Cardox-Hardsocg Mining-Drill that reaches into thin seams and pulls out the coal without the need for excessive timbering. Cleaner coal is obtained without impurities from the roof or bottom.

Low and sturdily-constructed, this drill will handle augers of 20", 24", or 30" in diameter, in multiple sections 6' long. The drill is powered by a 25 HP electric motor which drives the augers through a fluid coupling, a dry-plate clutch, a reversing and a final gear box whose output shaft has an auger chuck on each end to provide two-way operation.

The Cardox-Hardsocg Underground Mining-Drill has proved its value by operating in otherwise inaccessible areas and by opening up new sources of coal that can be produced at a profit. Performance tests show that it offers high productivity per man. Management is finding many applications for this simple, practical, low-cost machine.



Mining-Drill with coring-type cutterhead. Height and angle of the drill are quickly adjusted by the hydraulic action of the jacks which lock automatically after being placed.



The operator's side of the drill showing two of the three built-in, hydraulic roof-jacks which are controlled by the operator using centrally-located, lever-actuated valves.



What do his figures tell him about this rope ?

Since the day it was installed, he's kept a brief record of this wire rope's performance. The black book tells him the date it went to work, the type of work it's doing, and roughly just how much it does each day. When the rope is retired from service, he'll be able to say whether it's done a good job for him—given him his money's worth.

Smart man! For of course he isn't keeping tabs on just this one rope. He follows the system with all the major wire ropes he buys. And why? Because he learned years ago that you can't compare brands of rope by guessing—by vague, hit-or-miss estimates.

Bethlehem earnestly recommends that you, too, keep figures on rope performance. Nothing elaborate—something that costs you only a few minutes' time each day. You see, we're so confident of our own product, Bethlehem wire rope, that we'd like to have you check it yourself. Stack it against the competitive brands of your choice. Keep records on all of them!

When you've been doing it long enough to make a comparison, study those figures. They'll tell you that every dollar invested in Bethlehem rope is money well spent . . . that you can't buy finer rope anywhere.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation
Export Distributor: Bethlehem Steel Export Corporation



LET YOUR RECORDS TELL YOU!





SILENTLY, but ruthlessly *(even as you are reading this)* rust is gnawing away at tipples, sheet metal, bins, machinery, conveyors, mine cars, underground structural steel and piping—every rustable metal inside and outdoors.

To protect your investment—to keep every possible pound of new steel for the defense program—to make all rustable metal surfaces last longer—*adopt rust control with RUST-OLEUM as an important part of your maintenance program.*

RUST-OLEUM stops rust! Its tough, pliable, rust-resisting film gives excellent protection that prevents rust losses under many difficult rust-producing conditions.

RUST-OLEUM can be applied *even* over rusted surfaces. It is not necessary to remove all the rust. Just use wire brush and sharp scraper to remove rust scale and loose rust. Economical and easy to use because no sand blasting or chemical pre-cleaning is required.

RUST-OLEUM can be obtained promptly from Industrial Distributors' stocks in principal cities of the United States and Canada. Anticipate your needs and order now! For complete catalog see *Sweet's*, which also lists your nearest source of supply, or write on your company's letterhead for full information.

RUST-OLEUM CORPORATION
2462 Oakton Street, Evanston, Illinois

"Rigid Economy Man!"

RUST-OLEUM

Stops Rust

Beauti... AS IT ...

Available in many **COLORS,** aluminum and white.





The Ease of Operation of the Whaley "Automat" Is Important to the Economical Operation of Your Mine!

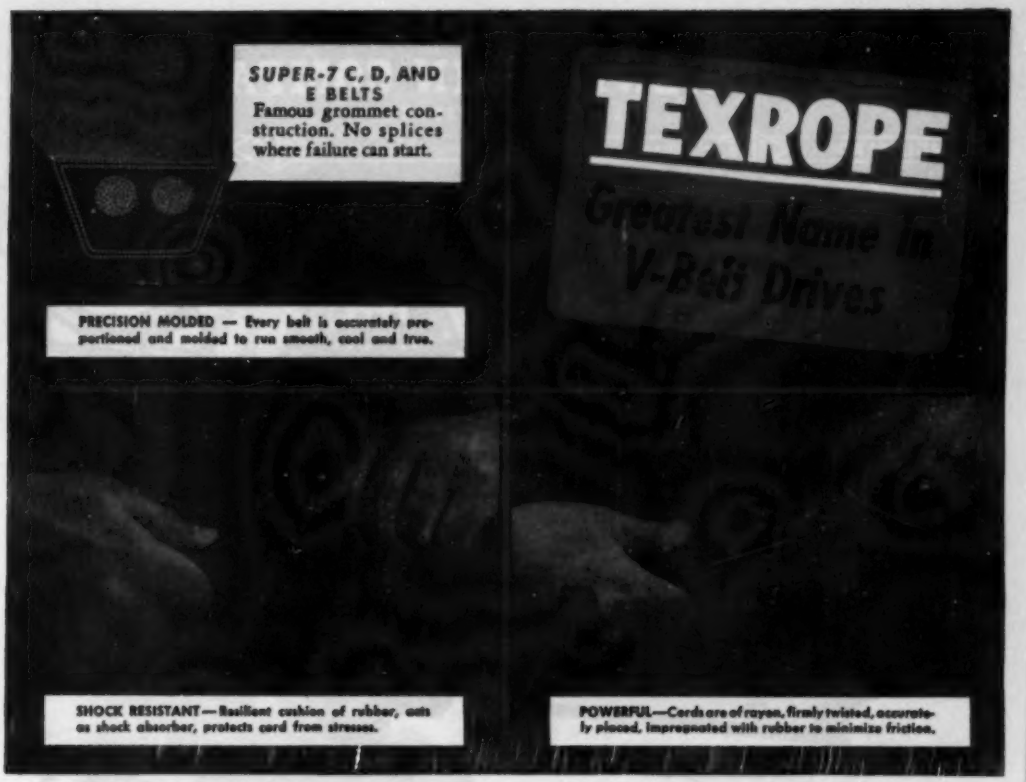
Ask any coal mine superintendent with mechanical loading experience and he will tell you why the Whaley "Automat" can take the punching of coal or rock loading so consistently. He will tell you why it runs smoother, has fewer breakdowns which naturally results in less down time and minimum maintenance.

The "Automat" has no equal when it comes to standing up under the wear and tear of rock work and loading consistently at high capacity! This performance-proved fact makes the easier task of coal loading comparatively easy for the "Automat". Its exclusive shovel type loading head penetrates the coal or other material at the logical point—the bottom—and loads with the greatest possible ease! For coal or rock loading you need the dependable, economical performance of the powerful Whaley "Automat". For complete information, write us today! Myers-Whaley Company, Knoxville 9, Tennessee.



MYERS-WHALEY

"MECHANICAL LOADERS EXCLUSIVELY FOR OVER 40 YEARS"



Cool Running... LONG LIVED!

SUPER-7 V-belts give long, satisfactory service even under bad conditions of load, shock and grit.

Tough, double-wrapped cover bias cut for elasticity and impregnated with rubber. Effectively seals out dust, grit, moisture; takes the wear; keeps the belt in shape; and protects cord structure.

But you get more than good belts when you standardize on *Super-7* V-belts. You also get the benefit of the greatest V-belt experience in the world both in the field and factory. You are assured of exactly the right drive for longest life from the wide variety of types and sizes available.

High Capacity Belts

Where space is limited or other special conditions demand heavier duty, the high capacity belt can be furnished in A, B, C, D, and E sections . . . Extra strong cords, special rubber cushion and tough Neoprene cover give them 40% greater capacity than standard belts at proportionately higher price.

V-Belt Drive Headquarters

Your nearby Allis-Chalmers Authorized Dealer or Sales Office can serve all your V-belt needs, whether they be new or replacement V-belts; standard and variable speed sheaves; or speed changers.

Get your copy of the revised 120 page *Texrope* Pre-Engineered Drive Manual from your A-C Dealer or Sales Office or write for Booklet 20B6956A. Allis-Chalmers, Milwaukee 1, Wisconsin.

A-2293

Texrope and *Super-7* are Allis-Chalmers trademarks.

Sold . . .
Applied . . .
Serviced . . .

by Allis-Chalmers Authorized Dealers, Certified Service Shops and Sales Offices throughout the country.



MOTORS — ½ to 25,000 hp and up. All types.

CONTROL — Manual, magnetic and combination starters; push button stations and components for complete control systems.





PUMPS — Integral motor and coupled types from ¾ in. to 72 in. discharge and up.

ALLIS-CHALMERS

INDUSTRIAL DIVISION

CONTINENTAL GIN COMPANY

BIRMINGHAM, ALABAMA

ENGINEERS CGC ATLANTA • DALLAS • MEMPHIS • NEW YORK CGC MANUFACTURERS

Conveyors, Elevators & Power Transmission Equipment

★ IDLERS FOR EVERY PURPOSE ★



STANDARD DUTY IDLER



RUBBER DISC IMPACT IDLER



RUBBER TIRED IMPACT IDLER



HEAVY DUTY IDLER



SELF-ALIGNING RETURN IDLER



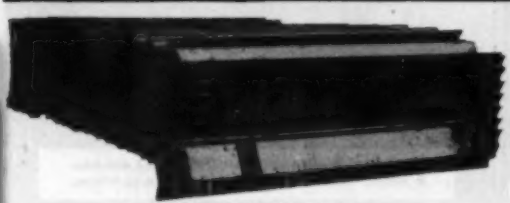
SELF-ALIGNING TROUGHING IDLER



PICKING TABLE IDLER



SELF-ALIGNING FLAT BELT IDLER



SHAKER CONVEYOR PANS & LINERS
CHAIN DRAG PANS



TRANSMISSION DRIVES



MINE CAR SPOTTING HOISTS

CG-4906B



PULLEYS, GEARS, COUPLINGS

The above products are of Continental Meehanite—a superior product, insuring strength and long life.

BELOW

TYPICAL INSTALLATIONS
USING CONTINENTAL PRODUCTS

1. Overland coal haulage from mine tipple to shipping bin.
2. Belt conveyor hauling coal to tipple.

ALWAYS *Specify* CONTINENTAL





Cummins®
CUSTOM BUILT
Diesels



BUILT NOT ONCE BUT TWICE



Each rugged, lightweight *and* high-speed Cummins Diesel is actually built *twice*. It's assembled, run-in tested, disassembled . . . inspected . . . then reassembled and tested again. And each engine is custom-built *to fit the job*. Extra care in building, Cummins exclusive fuel system, efficient service and parts organization, enable users to get *less* "down-time", *more* power and profits from Cummins Diesels. *See your Cummins Dealer.*

Diesel power by CUMMINS

CUMMINS Engine DIESEL

Lightweight High-speed Diesel Engines (50-550 hp)
for: on-highway trucks
off-highway trucks • buses
tractors • earthmovers
shovels • cranes
industrial locomotives
air compressors
logging yarders and loaders
drilling rigs
centrifugal pumps
generator sets and power units
work boats and pleasure craft

CUMMINS ENGINE COMPANY, INC., COLUMBUS, INDIANA

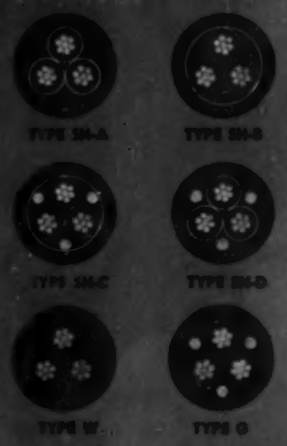
Export: CUMMINS DIESEL EXPORT CORPORATION • Columbus, Indiana, U.S.A. • Cable: CUMDIEX

back up your shovels with

TOUGH, MOLD-CURED HAZACORD

IT'S A TOUGH LIFE that electric shovel cable has to face. That's why Hazacord Shovel Cable is specially designed and constructed with the extra strength and durability that pays off in this severe service. Take Hazacord's outside protection—the Hazaprene ZBF Sheath. It's a double-layer, reinforced sheath that's mold cured under pressure to form a dense, homogeneous wall with tire-tread toughness and resiliency. Compounded with neoprene, it's unaffected by oil, acids, water, and sunlight. Yet with all the life-extending toughness you get with Hazacord Shovel Cable, ample flexibility for easy handling is retained.





TO KEEP SHOVELS WORKING Hazacord is designed-for-the-job with many "inside" features as well that give you *extra protection* against cable failure. Long-lived, electrically stable, heat-resisting Performite insulates each conductor; permanently colored Okobestoprene Tape (a non-fibrous asbestos-neoprene material developed by Okonite) is precision wrapped around each insulated conductor. It seals into a flame- and moisture-resistant, non-rotting protective covering that also provides flexibility and permanent circuit identification. For moisture tightness at cable ends, and added cushioning qualities, Hazaprene fillers are used in conductor interstices instead of ordinary fibrous material.

For full information on Hazacord's many features that are delivering money-saving service to more and more operators—ask your Hazard representative to call, or write Hazard Insulated Wire Works, Division of The Okonite Company, Wilkes-Barre, Pa.

HAZARD ...bles for every mining use



Here's a big, rugged machine with stability unsurpassed in its size range. Stability that means big loads with long booms (60 tons at 12' radius); that means long reach with full capacity buckets on dragline work; stability that means ability to handle extra-long booms up to 140' for crane service.

And when you compare working speeds, digging cycles, construction features, service accessibility, the 3500 tops 'em all . . . that's why it's top choice among users who've tried 'em all.

And it's available to meet your exact needs, as a shovel, crane or dragline; optional choice of crawler lengths; long or short booms; independent boom hoist or swing; choice of power plants; air or manual controls. Send for complete details today. Manitowoc Engineering Works, Manitowoc, Wisconsin.

PLUS TORQUE CONVERTER DRIVE

PRECISE CONTROL
"Fraction of an inch" control by either hand throttle or foot accelerator, without slipping clutches or shifting speeds.

SMOOTHER OPERATION
Cushion of oil absorbs jarring impacts which saves cables, clutches and machine assemblies.

BALANCED POWER-LOAD
Engine operates at maximum efficiency at all times . . . full engine power under full load, just enough power for light loads . . . assuring economy of operation. Engine cannot stall and develops full "lugging" power. Load requirements and engine horsepower always automatically balanced.

INFINITE SPEEDS
No gears, but all the advantages and none of the disadvantages of automatic, multi-speed transmissions. An infinite number of speeds at your command without shifting, since speeds and power are automatically balanced at all times.

MANITOWOC
SHOVELS 1-5 YD. Speedcrane CRANES 18-100 TON



Coal Stays in the Black

ON YOUR SALES LEDGER

You are looking at a money-making coal preparation plant. Run of mine coal enters at the top, is automatically processed to specifications and delivered to railroad cars for shipment to waiting markets.

"***Uniformity of quality*** of the nut and slack coal produced in our plant and so widely used now in underfeed and spreader type stokers is particularly gratifying to us," says Red Jacket.

You, too, can up-grade your coal to premium class at only a few cents a ton. You can satisfy your customers . . . meet and beat competition. Yes, you can make sure that your "coal stays in the black on your sales ledger."

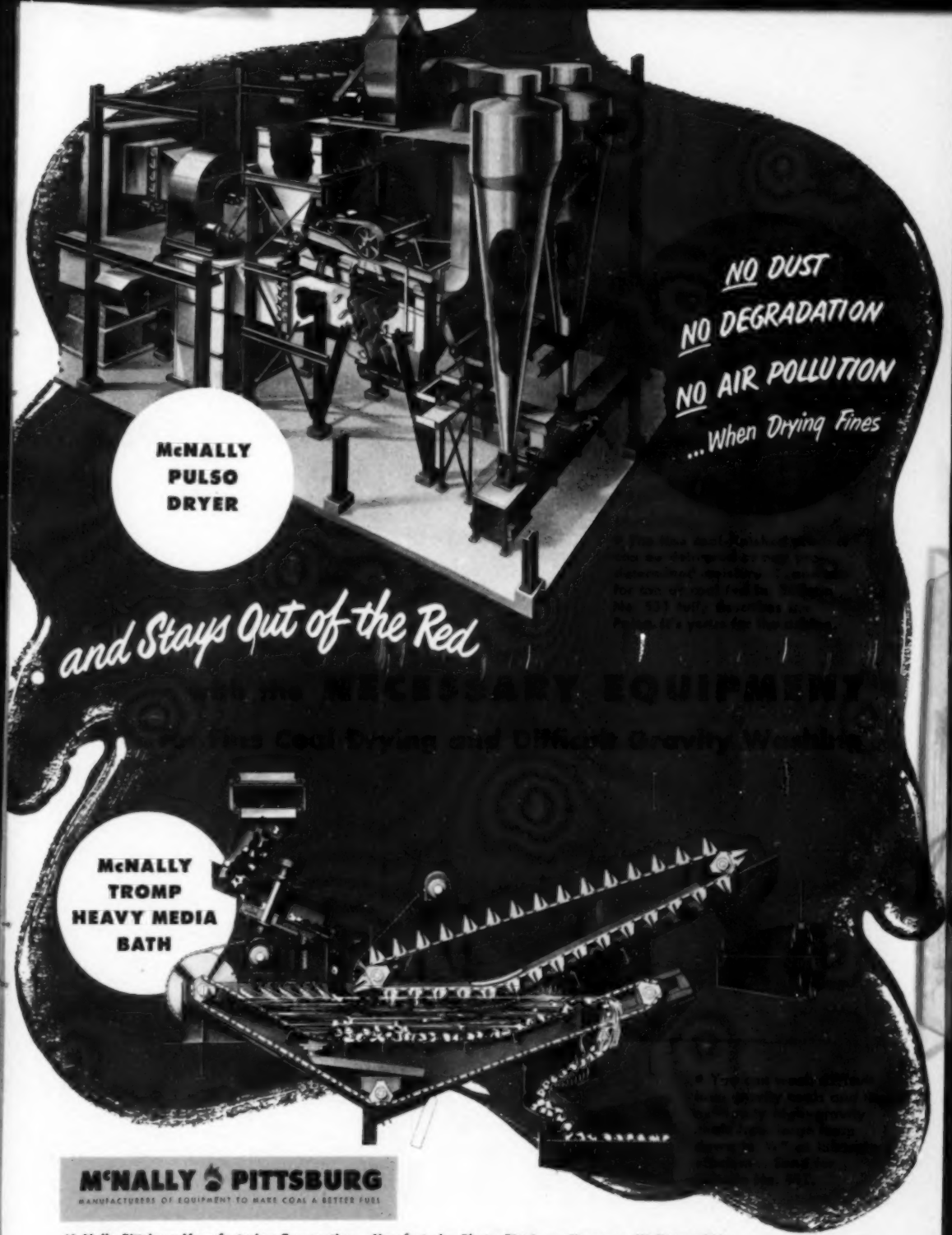
Talk it over with our Consulting Engineers. This service is offered to you without cost or obligation.

Coal Preparation Plant of Red Jacket Coal Corporation, Columbus, Ohio

McNALLY PITTSBURG

MANUFACTURERS OF EQUIPMENT TO MAKE COAL A BETTER FUEL

McNally Pittsburg Manufacturing Corporation—*Manufacturing Plants:* Pittsburg, Kansas • Wellston, Ohio
Engineering & Sales Offices: Pittsburgh • Chicago • Rio de Janeiro • Pittsburg, Kansas • Wellston, Ohio



McNally Pittsburg Manufacturing Corporation—*Manufacturing Plants:* Pittsburg, Kansas • Wellston, Ohio
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No. 1615 Diaphragm Valve
Iron Body, Neoprene lined

It *costs more* to fix piping now!

You do less fixing

by using Dependable Quality

CRANE VALVES

...That's why more Crane Valves are used than any other make

better performing diaphragm valves

Separate disc and diaphragm design distinguishes these Crane Valves from all similar packless types. Life of diaphragm is multiplied because it's used only to seal the bonnet—not for seating. The separate disc seats the valve, eliminating wear and tear on the diaphragm.

Increased flow capacity... reduced flow resistance... tighter seating... lower torque and fewer turns to operate... are typical added features of Crane Diaphragm Valves. Wherever you use them, you can be sure of outstanding performance.

Such better quality and greater dependability mark Crane valves and fittings of every type—and assure the lowest ultimate cost.

CRANE

CRANE CO., *General Offices:*
836 S. Michigan Ave., Chicago 5, Ill.
Branches and Wholesalers Serving All Industrial Areas

VALVES • FITTINGS • PIPE • PLUMBING • HEATING



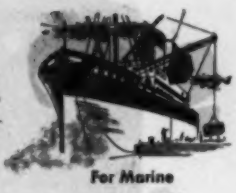
For Logging



For Sand and Gravel



For Aircraft



For Marine



For Stone Quarries



For Construction



For Elevators



For Mining



For Drilling



For Industrial

For better service and more economy

MACWHYTE

PREformed...Internally Lubricated

WIRE ROPE

A thousand and one **to order from**
ensures the right rope for your equipment

It will pay you to get Macwhyte Wire Rope, engineered and job-proved for your particular equipment. Over the years, ropes for all types of equipment in every field have been developed by Macwhyte. Recommendations are promptly available from Macwhyte distributors or Macwhyte Company. You get the correct wire rope for your equipment when you buy Macwhyte.



MACWHYTE COMPANY, 2931 Fourteenth Avenue, Kenosha, Wis. Manufacturers of Internally Lubricated PREformed Wire Rope, Braided Wire Rope Slings, Aircraft Cables and Assemblies, Monel Metal and Stainless Steel Wire Rope. Catalog available on request. Mill depots: New York • Pittsburgh • Chicago • Minneapolis • Fort Worth • Portland • Seattle • San Francisco • Los Angeles • Distributors throughout U.S.A.

BULLETIN 5025 gives information on "How to order Wire Rope" and lists all sizes and constructions of Improved Plow Steel Monarch Whyte Strand Wire Rope. Copy sent on request.


Minestarter
PAIRED FOR PRODUCTION
Life-Line motor
DO NOT LUBRICATE

Dependability...

wrapped in explosion-proof construction

Here's an explosion-proof team that has the inherent dependability so important to today's mining operations. There's no time to pamper motors and controls. After installation, they have to stand on their own feet. These Life-Line motors and Minestarters have been establishing such a record for many years. They're built to meet Bureau of Mines standards.

Look at this Life-Line SK d-c motor.

Its pre-lubricated double-sealed bearings need no lubrication. The bearings are sealed, too—no chance for grit or dirt to enter and cause bearing wear. The heavy all-steel frame and feet add extra mechanical strength—stand up to the daily abuses encountered in many mine locations.

What about the Minestarter?

Its design provides continuous operation. Magnetic blowouts on the magnetic contactor quickly confine, divide and extinguish the arc—minimize burnout of contact tips. Contacts operate with a rolling action—confine arcing to the tips of the contacts. Thermal overload relay lags on short high-current peak during starting—acts instantaneously when overload can cause damage.

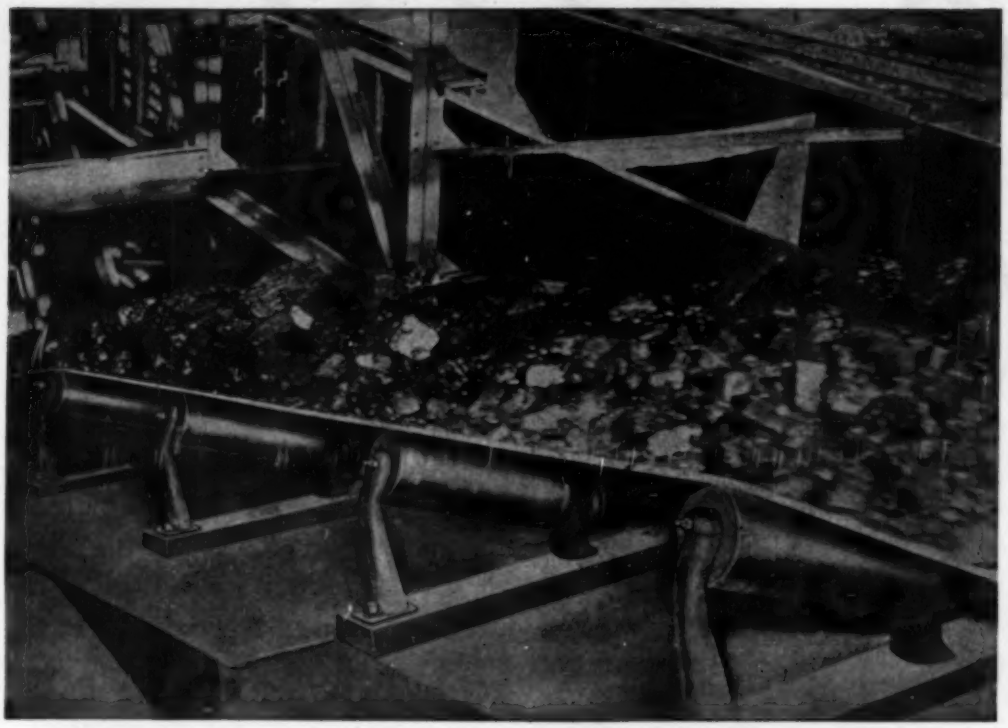
Talk it over with your Westinghouse representative. Ask him for a specific recommendation to meet your problem. Or, write direct to Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pennsylvania. J-21650

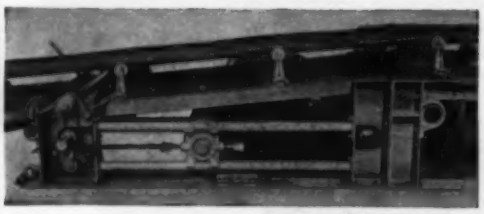
YOU CAN BE SURE... IF IT'S

Westinghouse

MOTORS and CONTROLS

ONLY ONE FIRM TAKES FULL MINE CONVEYOR PERFORMANCE



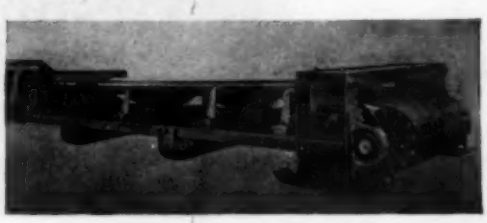


TAIL SECTION ➡

Telescopic type to provide tail takeup action. Easy to clean out—no steel work under tail pulley. Has transverse cover to protect pulley, bearings *and belt.* Strong enough so you can rest a feeder on it.

⬅ **INTERNAL TAKEUP**

Located directly back of the drive. Handles 10′ of belt slack. Operated by reversible ratchet-wrench working on gear reduction to minimize manual effort. Double-acting pawl prevents backing-up. Worked from either side of conveyor.



RESPONSIBILITY FOR COMPLETE

. . . only HEWITT-ROBINS makes and guarantees both machinery and belt

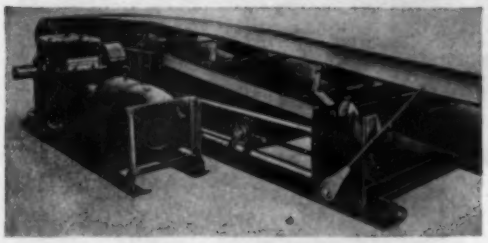
No longer need you worry about your Mine Conveyor operation—wondering who will be responsible for the successful, *lasting* performance of its machinery *and belt.*

Get your Mine Conveyor from Hewitt-Robins. Here is a company—the only company in all the world—able *and willing* to take complete *unified* responsibility for the installation. For only Hewitt-Robins makes both machinery *and belt.*

The machinery is the sturdy, strong, substantial construction made by the Robins Conveyors Division and installed in all the better mines. The belt is the long-wearing Ajax® Underground Belt—with mildew inhibitors and acid neutralizers compounded in its wear-resisting rubber covers and high tensile fabrics in its enduring carcass—made by the Hewitt Rubber Division.

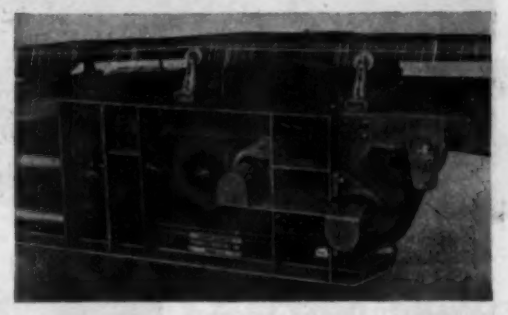
Yes, when you buy a Hewitt-Robins Mine Conveyor you get not only the best elements —machinery and belt—that your money can buy; you also get the satisfaction and peace of mind that come from having one unified source guaranteeing successful performance.

Hewitt-Robins Mine Conveyors can be shipped complete—machinery, belt, motors, reducers and drives—out of stock from Passaic, N. J., and Charleston, W. Va., in belt widths 26", 30" and 36", any desired length. For immediate delivery, get in touch with Hewitt-Robins, Inc., 1010 Pennsylvania Ave., Charleston, W. Va., or 270 Passaic Ave., Passaic, N. J.



UNIFIED DRIVE SECTION

Motor, reducer and controls mounted on a single base—skid-designed for easy moving about. Can be located on either side of the conveyor. Drive reversible—incoming for men and material, outgoing for high output of product.



SINGLE OR TANDEM DRIVE

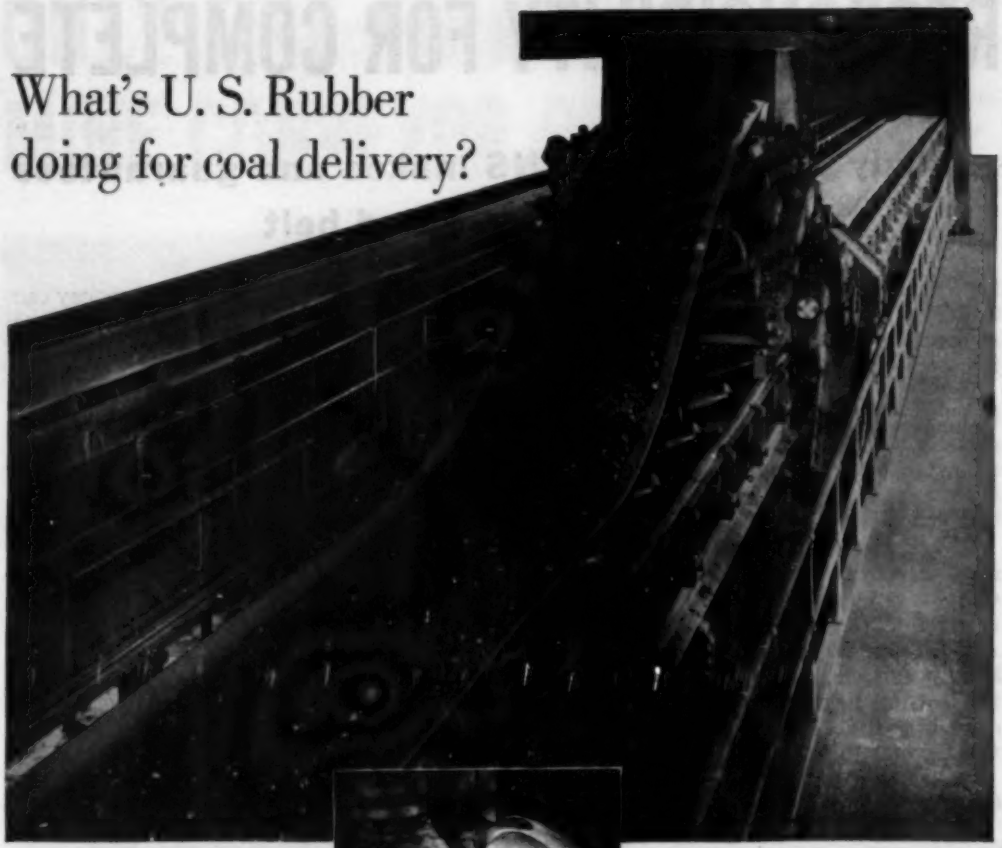
Hewitt-Robins Mine Conveyors come equipped with *both* single and tandem pulley drive elements. Provide ample horsepower for lift and length up to the very limits of belt capacity. Reeving of belt handles level, uphill or downhill service requirements.

HEWITT-ROBINS
MINE CONVEYORS

HEWITT-ROBINS HR INCORPORATED

BELT CONVEYORS (*belting and machinery*) • BELT AND BUCKET ELEVATORS • CAR SHAKEOUTS • DEWATERIZERS • FEEDERS • FOAM RUBBER PRODUCTS • FOUNDRY SHAKEOUTS • INDUSTRIAL HOSE • MINE CONVEYORS • MOLDED RUBBER GOODS • RUBBERLOKT ROTARY WIRE BRUSHES • SCREEN CLOTH • SKIP HOISTS • STACKERS • TRANSMISSION BELTING • VIBRATING CONVEYORS, FEEDERS AND SCREENS

What's U. S. Rubber doing for coal delivery?



THIS NEW U.S. CONVEYOR BELT (above) 42 inches wide, 1,984 feet long, weight 18 tons, replaced the earlier "U.S." belt that had been 21 years on the job. The original belt traveled 231,818 *miles*, almost equivalent to a trip to the moon, before being replaced.



SPLICING ON THE JOB is a U. S. Rubber specialty. It took the man on the left and his fellow-workers 12 hours to install the belt – a record-breaking time—thanks to the cooperative planning between the "U.S." engineers and the operator.

"U.S." makes conveyor belts that last longer. This particular belt installation in a mid-west electrical generating plant replaced a 21-year-old belt that had a record run of service. It can be fully expected to give an even finer performance.

The technical progress made by United States Rubber engineers in belt construction is enabling mine operators and coal handlers to increase output and decrease their operating costs. Your materials-handling problem is never too big or complex for "U.S." belting specialists. Contact them through the address below.



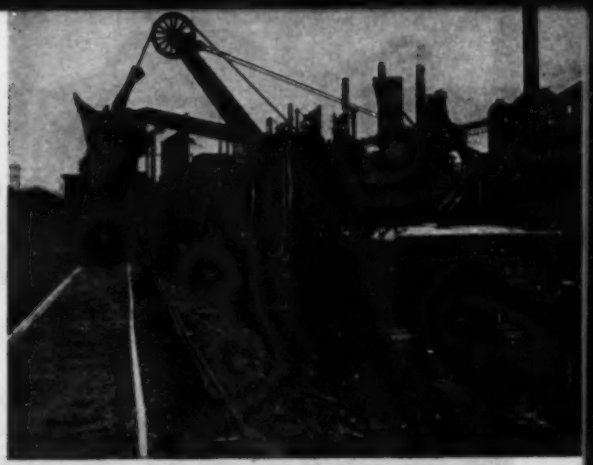
THE OLD U.S. CONVEYOR BELT traveled this near-1000 foot runway at a rate of 360 feet per minute – delivered over 17 million tons of coal – gave continuous trouble-free service in its long history.

PRODUCT OF

U.S. RUBBER
SERVING THROUGH SCIENCE

UNITED STATES RUBBER COMPANY

MECHANICAL GOODS DIVISION • ROCKEFELLER CENTER, NEW YORK 20, N. Y.



down come costs



These two P&H Electrics serve the same steel-making operation at Birmingham, Alabama. The Model 1600, owned by the Birmingham Slag Company, is loading blast furnace slag. The Model 1400, digging fluxing stone, is owned by the Stockbridge Stone Company.

with P&H ELECTRIC SHOVELS

Wherever these new P&H Electrics take over, costs go *down!* It couldn't be otherwise, with all the improvements that make for faster, smoother, more dependable digging.

There's Magnetorque* Hoist Drive, which gives you snappier dipper action with electro-magnetic power — completely eliminates hoist generator, hoist motor, slip friction clutch, and other mechanical devices.

There's P&H stepless power regulation — smoother, more accurate — and no control fingers or contactors to require maintenance or give you trouble.

There's tough, all-welded construction for extra strength without excess weight.

There's more — *much more* — see a P&H before you invest in new equipment of this type.

* Trade-mark of Harnischfeger Corporation for electro-magnetic type clutch.

P&H HARNISCHFEGER CORPORATION

ELECTRIC SHOVELS
4540 West National Avenue
Milwaukee 14, Wisconsin

Every third P&H Electric Shovel sold is a repeat order

POWER SHOVELS • CRAWLER AND TRUCK CRANES • OVERHEAD CRANES • HOISTS • ARC WELDERS AND ELECTRODES • SOIL STABILIZERS • DIESEL ENGINES • PRE-FAB HOMES

YOU CAN DEPEND ON

Rome 60 Mining Cables



"P-105 B/M" molded in the Neoprene sheath is your assurance of compliance with Federal and Pennsylvania Safety Codes.

• The open braid around each conductor firmly interlocks conductors to sheath . . . prevents twisting, loosening and pulling.

The grounding conductor, solidly embedded in a Neoprene web, gives exceptional protection against "shorts" and mechanical injury . . . yet maintains flexibility and minimizes conductor distortion and fatigue.



to keep production up . . . Interlocking braid

prevents failure from twisting, bending or pulling of conductors

Now, more than ever, it is essential to keep production at a maximum. With costs spiraling, "down time" grows increasingly expensive. Yet, tens of thousands of dollars worth of equipment standing idle and costly man hours wasted are often the result of a single cable failure. That's where the extra quality of Rome 60 Mining Cables pays off.

With Rome 60 Mining Cables you don't have to worry about conductors twisting, pulling or loosening within the Neoprene sheath. A long-time feature of Rome 60 is a reinforcing braid interlocking . . . actually "gearing" individual conductors to the sheath and providing 360 degrees of balanced adhesion. Further, this open braid construction does not reduce sheath thickness . . . does not create thin spots.

Rome 60 Flat Twin (Parallel Duplex), Type G, for shuttle car service, features a Neoprene webbing between power and grounding conductors, which unlike fibrous components, cannot rot, deteriorate or wick moisture. Note the integrated construction of the cable illustrated. The resiliency of Neoprene, compared with fibrous materials, provides higher impact resistance, as well as increased protection against short circuits. The absence of restraining fibrous "separators" results in maximum flexibility for fast reeling applications.

All Rome 60 Mining Cables are insulated with a special heat-resistant rubber compound suitable for operation at 75° C., thereby providing extra overload protection.

The Neoprene sheath is molded to a tire-like toughness. It is highly resistant to acids, alkalies, oils, abrasion and flame. *It is made for long and tough service.*

Copper wire mill products are a Controlled Material under N. P. A. Controlled Materials Plan. USE YOUR CMP ALLOTMENT.

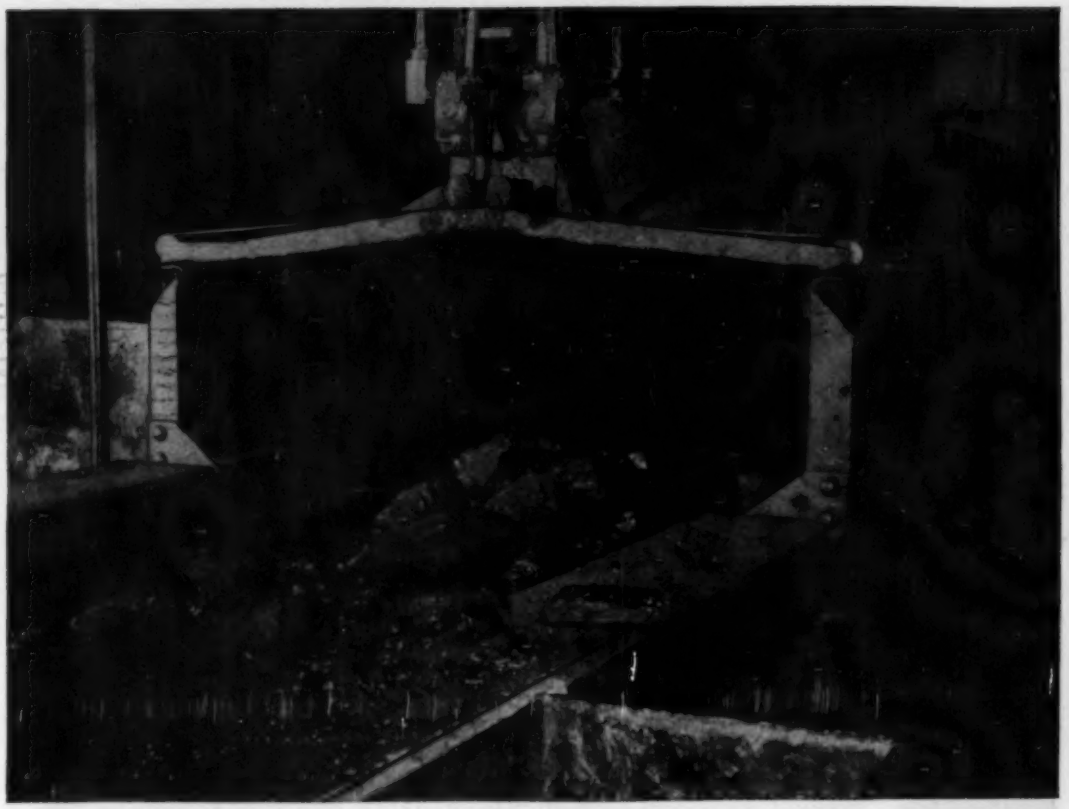
A Wide Selection of Tough, Dependable Rome 60 Mining Cords and Cables:

- Type SO Portable Cords
- Single Conductor Locomotive Cables
- Concentric Mining Machine Cables
- Flat Twin (Parallel Duplex) Mining Machine Cables—Types W and G
- Multiple Conductor Portable Power Cables—Types W and G
- Shot Firing Cord
- Mine Power Distribution Cable
- Shovel and Dredge Cables

IT COSTS LESS TO BUY THE BEST

ROME CABLE
Corporation
ROME • NEW YORK
and
TORRANCE • CALIFORNIA

ROME CABLE ROME, N.Y.



Hood on discharge end of picking table exhausted by **ROTO-CLONE.**

what happened to..

ROTO-CLONE DUST CONTROL IS THE ANSWER

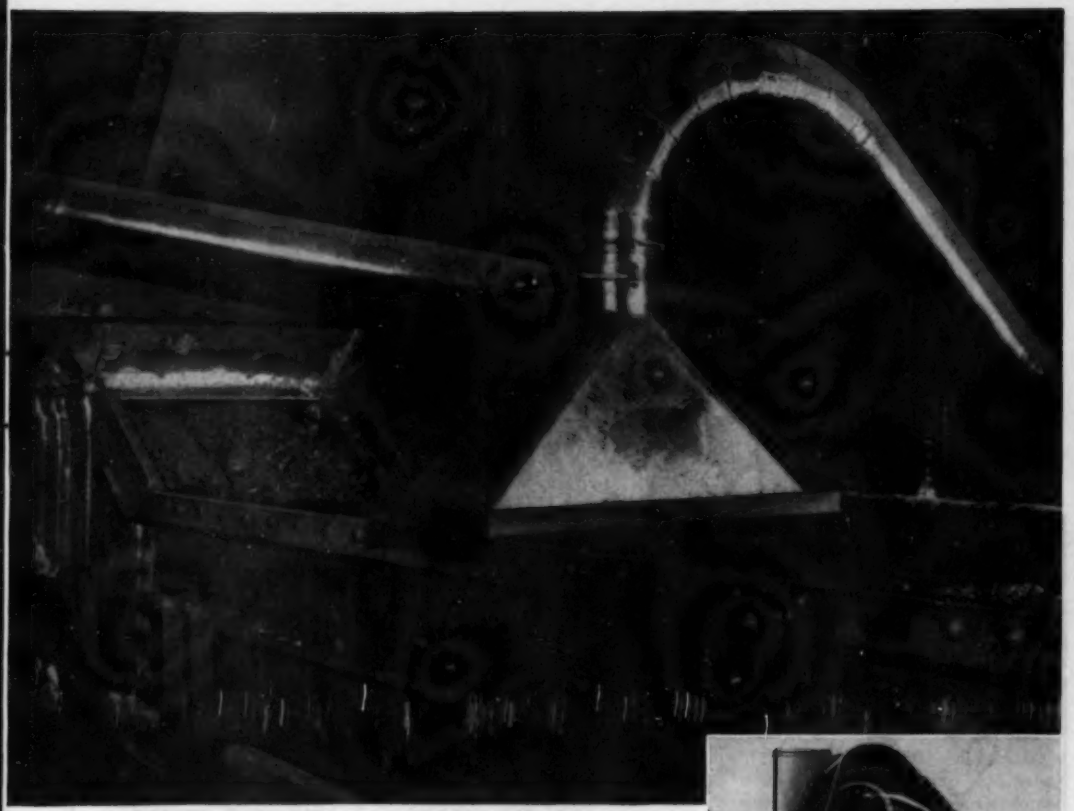
NEVER give dust a break . . . if you want to maintain low operating costs. ROTO-CLONE® dust control installations for coal mining operations soon prove that clean air is a sound investment.

Here's only one example. Before ROTO-CLONES were put to work, the oscillating pan feeder and picking table shown above were two sources of excessive dust concentrations. Other methods of dust suppression used by the operator had proved inefficient . . . and costly, since they reduced the quality of the coal after processing. ROTO-CLONES, however, solved these dust problems efficiently and economically . . . cutting operating costs in several ways.

Man hours were saved, mechanical efficiency improved, maintenance costs dropped . . . and coal quality was unimpaired.

The many sizes, types and arrangements of ROTO-CLONES have solved almost every dust problem in the mining cycle. If dust sources are adding to your operating costs, call your nearby AAF representative . . . or write direct to us for Engineering Bulletin No. 270.

AAF



ROTO-CLONE exhausts oscillating pan feeder even when covers over feeder are removed.

..the coal dust?

The TYPE N ROTO-CLONE is a dynamic precipitator of the hydrostatic type providing these performance characteristics:

- High efficiency in collecting both coarse particles and extreme fines in excessive concentrations.
- Dust collected in the hopper may be sluiced either continuously or intermittently.
- Continuous operation at peak efficiency without interruption for reconditioning.
- Minimum space requirements as single units perform functions of both exhauster and dust collector.
- Uniform air delivery assures sufficient air flow at hoods and unvarying air velocities in ducts at all times.
- Shop assembled and pre-tested for ease of installation.



Cross section of Type N ROTO-CLONE arrangement D with dual impeller showing water curtains created by air flow.

American Air Filter
COMPANY, INC.

267 Central Ave., Louisville 8, Ky. • In Canada: Darling Bros., Ltd., Montreal, P. Q.

**ROTO-CLONE is the trade-mark (Reg. U. S. Pat. Off.) of the American Air Filter Company, Inc., for various dust collectors of the dynamic precipitator and hydro-static precipitator types.*

Want Help WITH SCREENING?



ALLIS-CHALMERS district offices offer you the services of experienced vibrating screen engineers. In all mining areas are specialists who have the training and experience to help you get top screening performance and lowest screening costs for your job.

These experts will come into your plant, look over your present equipment, and suggest how your screening can be made a more profitable operation. Their recommendations are unbiased because Allis-Chalmers builds *all* types of vibrating screens . . . for *any* screening application. All Allis-Chalmers screens can be obtained complete with motor, drive and control.

Feel free to call on Allis-Chalmers for real help in solving screening problems. You'll be getting the finest engineering and experience available anywhere. Allis-Chalmers, Milwaukee 1, Wisconsin. 3512

Pulverator, Low-Head, Ripl-Flo and Aero-Vibe are Allis-Chalmers trademarks.

ALLIS-CHALMERS

Sales Offices in Principal Cities in the U. S. A. Distributors Throughout the World.

Pulverators | Vibrating Screens | Jaw Crushers | Grinding Mills | Gyratory Crushers | Kilns, Coolers, Dryers

SPECIFY

UPSON-WALTON

BRATTICE CLOTH



Upson-Walton dry-proofed brattice cloth is available in standard and heavy weights.

Always *dry*— Always flame-proof

FLAME-PROOFING of Upson-Walton dry-proofed brattice cloth does not depend on moisture, absorbed by chemicals. The chemicals used in treating Upson-Walton cloth flame-proof the cloth directly, and are not designed to absorb moisture for this purpose. Thus you can rely on this flame-proofing—under all conditions.

There are other advantages. Since it does not soak up moisture, Upson-Walton cloth weighs less. Grade for grade, weight is cut as much as 15%. This means easier handling and lower costs.

With a dry-proofed cloth, fungus growths have less chance to start. Thus the cloth gives longer service, and can be re-hung. For added safety and economy, specify Upson-Walton when you need brattice cloth.

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"How Can I Get Balanced Coal Mining



Automatic Drop-Bottom Mine Cars are the only known means of coal mine transportation that will allow a continuous movement of coal from the face, or loading point, to the railroad car. One who has not observed automatic coal mine haulage cannot visualize the continuity and smoothness of the operation. The cars are loaded and hauled by locomotives in the usual manner. As the trip of cars approaches the head house, they pass over an automatic scale where the coal is weighed in motion. The trip moves on to large surge bin (see photo below left) where the cars automatically lay down their load of coal without breakage and without hesitation. This continues until the surge bin has been completely filled (see photo below right) and the coal has been automatically leveled with the track from end to end. After dumping, the car doors are automatically closed and the trip runs smoothly back into the mine for reloading. Slate cars are dumped selectively and automatically at wells or slate bins at the approach to, or beyond the coal bin. The whole smooth, continuous operation is accomplished without stopping, with the same locomotive, coupled to the same cars, and with no delay.





SANFORD-DAY IRON WORKS

Continuous, Flexible and at a Lower Dollar Cost?"

We, at Sanford-Day, find coal operators everywhere constantly trying to find the one sure answer to the above question. Many of them have accepted our solution to the problem and now agree that it is unquestionably the only successful system for realizing lowest cost coal production.

First and fundamental to the success of the system is an ***Adequate Surge Bin.*** Second is an adequate number of S-D Automatic Drop Bottom Cars. The Automatic Car is the only practical method of completely filling a surge bin. The only way a continuous flow of coal from the face and continuous supply of coal to the preparation plant can be accomplished is through the use of a surge bin which will serve as a temporary storage for coal in transit. This temporary storage permits your mining operations and your preparation plant to function independently of each other. They are separate and distinct functions. For each to operate in the most economical manner, they must be carried on independently:

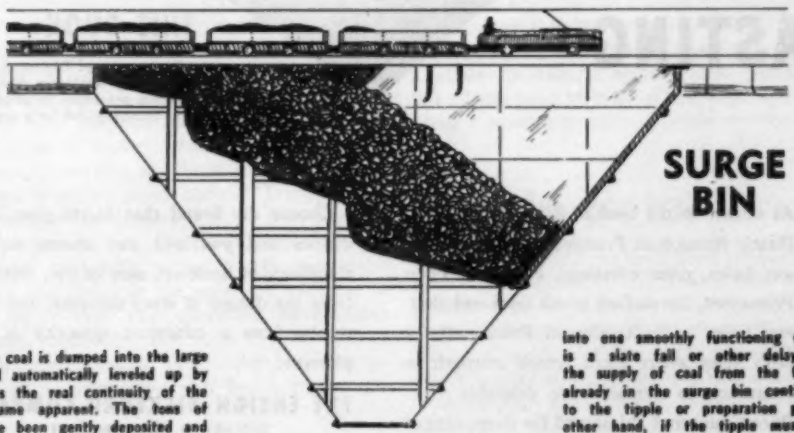
1—Any cleaning plant works best, and at the least cost, with an even continuous supply of coal. The surge bin continues to supply coal to the preparation plant when there is a breakdown or delay at the face.

2—Breakdowns or delays at the preparation plant need not stop mine production because the surge bin will take the coal until repairs are made.

The Automatic coal mine haulage system was pioneered and developed by Sanford-Day Iron Works, a company of able engineers and mining men who have been originating and developing most of the improvements in design and construction of all type mine cars for over 50 years. In recent years this new system has become known through its wide use as the S-D "Automatic" System of coal haulage.

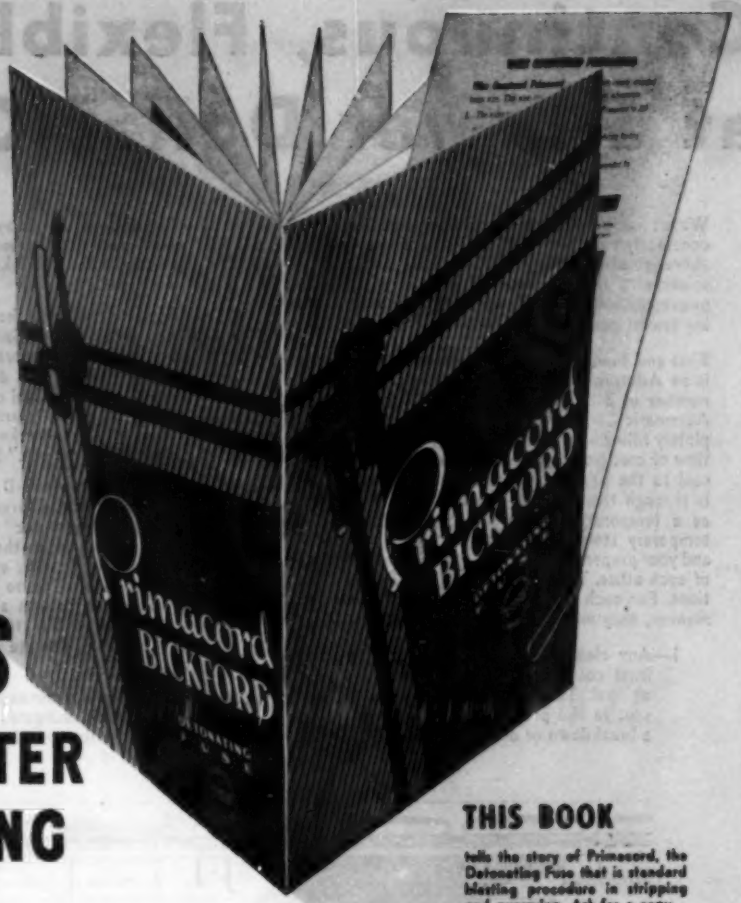
Without question, the S-D "Automatic" System, comprising an adequate surge bin and any required number of S-D "Automatic" Bottom Dumping Cars, is the most economical method of main line haulage ever developed. Its leading advantage is that it not only cuts haulage costs to the minimum, it also permits mining operations at the face and at the preparation plant to function at the least possible cost, because they operate independently of each other.

It may pay you in thousands of dollars of savings annually if you investigate this S-D "Automatic" System now! Write us today!



Only after the coal is dumped into the large surge bin and automatically leveled up by the cars, does the real continuity of the operation became apparent. The tons of coal that have been gently deposited and leveled in the surge bin become the means of providing a steady and uniform flow of coal from the face to the railroad cars. They join together the whole organization into one smoothly functioning unit. If there is a slate fall or other delay, cutting off the supply of coal from the face, the coal already in the surge bin continues to flow to the tipple or preparation plant. On the other hand, if the tipple must be stopped for repairs, coal continues to come from the face to be deposited in the bin. The preparation plant and the working face are no longer inter-dependent.

Knoxville 1, Tennessee



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PRIMACORD-BICKFORD Detonating •Fuse•

Devoted to the Operating, Technical and Business Problems of the Coal-Mining Industry

Coal Age

SEPTEMBER, 1951 IVAN A. GIVEN, EDITOR

Safety Roadblock

IF IT CAN BE ASSUMED that harassment is not the idea, then the recent action of the United Mine Workers in banning the introduction of diesel locomotives into coal mines certainly is shortsighted. With all the evidence, including 30 years of experience abroad, indicating that the diesel is far safer than the electric locomotive, the UMW stand becomes simply a roadblock delaying the attainment of highly desirable operating and safety goals. In fact, there is real question as to the authority of the union in view of the safety code, which contains the following provision: "Nonpermissible internal-combusion engines or other machinery which gives off noxious fumes shall not be permitted underground in any coal." The locomotive which is the target of the order is a permissible unit approved by the Bureau of Mines.

The relative safety positions of trolley and diesel haulage are clearcut. A sizeable number of miners are electrocuted each year in the United States by trolley wires and trolley poles. In contrast, there has not been a single fatality from diesel exhaust gases abroad. Trolley wires are responsible for numerous mine fires and explosions, while it is practically impossible to ignite diesel fuel with a match. On practically any score, the diesel is far safer, in addition to offering major cost and operating advantages. The sooner, therefore, the road can be cleared for its use underground, the sooner both the industry and its employees can begin to benefit.

New Mining Era?

WHEN AN INDUSTRY turns to the machine as a means of stimulating progress through lower cost, higher quality and greater safety, the stage is set for development of processes previously undreamed of. That is the situation in coal mining today. Now, as an extension of the machine-mining philosophy, equipment has been developed that makes it unnecessary for men to be at the face while production is going on. The big auger for flat or pitching coal and the long-hole drill for steep-pitch work are examples. While, like everything else, these machines have their limitations, the advantages of mining thin or pitching coal under bad top by sending a machine or tool in rather than men forecast a major expansion in mining of this type, accompanied by development of additional remote-mining machines.

Whatever the type of production machine used, however, the problem remains one of keeping it operating at capacity. In other words, transportation is the key. It should be as automatic as possible and all other service activities should be geared to keeping the mining or loading unit and the haulage system operating continuously at full capacity. This is a job mining men can work on anytime. In fact, it should be at the top of the list all the time in view of the real cost and operating advantages that efficient service provides.

Double Return

RESUMPTION of the national first-aid and mine-rescue competition at Columbus, Ohio, on Oct. 2-4, provides the coal-mining industry with a double-barreled opportunity. First, it can be a powerful stimulus to the safety consciousness that experience has proved results from first-aid and rescue training and competition. Second, it shows the industry to the public in its most-favorable aspect by providing concrete evidence of the steps being taken to promote the safety and welfare of the miner. Finally, representation in the meet can be nothing less than a powerful morale-builder around the mine. Now is the time to plan to participate. The man is W. H. Tomlinson, U. S. Bureau of Mines, Vincennes, Ind., contest-committee secretary.

Communism vs Freedom

Communism's Big Lies	What the Facts Are
1. Capitalism deprives workers of the fruits of their production.	**1.** In the United States, working men get more of the fruits of their production than anywhere else in the world; in Russia, fewer than anywhere else in the world.
2. Capitalist expansion eats up production.	**2.** When you open a mine or build a dam, whether it's in Russia or the United States, it's capital expansion. In Russia, the government provides the money and says what plants will be built, what they'll produce, who'll work in them and who'll get the products. Since the Russians think war is inevitable, they limit shoes and autos even in peacetime.
3. Capitalism is monopolistic and imperialistic.	**3.** In Russia, the government monopolizes foreign trade and all major industries, including coal mining. As for imperialism, the United States has freed the Philippines; fought for Free Korea and helped Greece, China, Indo-China and Burma fight Communism. Russia meanwhile has clamped iron rule on all Eastern Europe and much of Asia.
4. Capitalism exploits labor.	**4.** In Russia, about 20,000,000 political and military prisoners toil in slave-labor camps.
5. Capitalism forms a class society, with power concentrated in a few wealthy people.	**5.** A "class" society is thriving now in Russia. High costs limit education to the sons of bureaucrats and high-salaried engineers and managers.
6. Unions are a false front for Capitalist exploitation.	**6.** In Russia, unions are the Kremlin's tool for policing workers. Strikes are forbidden.
7. Under Capitalism, there's a great gap between rich and poor.	**7.** The gap between high and low wages in Russia has spread while it has narrowed in the United States.
8. American democracy is phony.	**8.** In Russia, there's only one political party and only one candidate for each office. Voters have no free choice.
9. Political parties deceive and mislead the voters.	**9.** In Russia, it's Party policy to deceive the people. In the United States, if one party tries to deceive the people, the other party brings the facts to light.
10. A free press is the instrument of corrupt Capitalist propaganda.	**10.** In Russia, the press is only a tool for agitation and propaganda—no free press, no freedom of information.
11. Capitalism breeds public scandals.	**11.** At least, voters in the United States can throw the rascals out. In Russia, the people are stuck with them.
12. Capitalism is reactionary and hidebound.	**12.** Americans have the widest freedom, the highest standard of living and the fastest-growing public-welfare program in the world. In Russia, men live under the harshest tyranny in the world. It's a return to barbarism.
13. Capitalism is a stumbling block to production.	**13.** Without tanks, guns, trucks and food from Capitalist America, Russia couldn't have survived World War II.
14. The United States is doomed for another great depression.	**14.** That remains to be seen. Anyhow, Americans live better even in depression than Russians do at any time.
15. Capitalist nations want a big war.	**15.** The Reds want a final bloody war between Communism and Capitalism. They don't want peace until Capitalism is wiped out.
16. Capitalism has set up a reign of terror to suppress the coming revolution of workers.	**16.** Take your choice—In the United States, all the freedoms you now enjoy. In Russia, shootings, mass murder, fake trials, midnight arrests, secret police and slave-labor camps.
17. There's no hope of reform in the United States, politically, morally or financially.	**17.** Count your blessings—A free vote, freedom to squawk and strike, good wages, the church of your choice, a home that's your castle, the right to own property, and a thousand other freedoms.

How You Can Help in . . .

Turning the Red Tide

The Communists Are Out to Get America As Their Final Step to World Rule. To Stop Their March, You Should Know:

What the Commies Believe — **How They Can Hurt You**

How They Operate — **How to Recognize a Red**

How to Fight Communism

COMMUNISM IS A MENACE to peace, prosperity and freedom wherever men work to enjoy the fruits of their toil. Communism is a clear and present danger on a global scale. It's also a threat to you on your own home ground—your family and home, your job, your company and the men whose work you direct and supervise.

Communism's aims, its concepts and its organization are world-wide. Its prophets are Lenin and Stalin. Its holy city is Moscow. There, 13 men in the Kremlin hold the lives and fortunes of 200,000,000 Russians and 95,000,000 subject peoples in their iron grip. These same 13 men are the master planners of a globe-girdling conspiracy to plunge the free nations and the Communist world into one all-out, final war from which Communism, they believe, will emerge triumphant.

These 13 men also pull the strings on hundreds of thousands of trained Communist puppets around the world. These puppets infiltrate governments, communities, organizations and factories. They provoke violent uprisings in backward countries in the name of "liberation" and, in industrialized countries like the United States, aim at control of vital industries and services. The target is disruption of morale and paralysis of industry among the enemies of Communism. This way, the Commies expect to insure victory in the inevitable war that lies ahead.

The Reds haven't yet moved in on the coal mines in the United States. But their masters rank coal mining, along with heavy industry like steel and transportation, as a primary target in their world revolution. In this country, they already have a strong grip on maritime-shipping, electrical-equipment and communications unions. In France, Belgium, Holland, West Germany and Great Britain, they play a strong if not controlling hand in the coal-mining unions. Unless you and other freedom-loving coal men—mine owners, managers, supervisors and foremen, mineworkers and mine-union leaders—keep your guard up, they may slip in our own back door.

You can keep the Commies out of the coal industry and provide real help to others in government, industry, transportation, agriculture, education and private life if: (1) you are really sold on America and the system our Nation is built on and (2) you learn as much as you can about the following questions:

What do the Communists believe?

How do they operate?

How can Communism hurt you, your employees and your fellow citizens?

How can you recognize a Red?

How can you help fight Communism?

What the Communists Believe

THESE ARE THE COMMUNIST BELIEFS, in a nutshell:

1. Working people in a Capitalist nation are downtrodden and exploited for the gain of property owners.

2. Communism will remedy this by seizing and controlling the sources of wealth and strength.

3. Socialism is a midway station on the way to revolution and Communist victory. Socialism takes over large-scale industry (steel, railroads and coal, for example) for government ownership and operation, sets up big government-run farms, collectivizes small landowners' farms, controls production and markets, and confiscates church and private property.

4. World revolution and Communist triumph are bound to come. The revolution will be violent.

5. Communism and Capitalism can't exist side by side. One must destroy the other in a final bloody war. Communism will win.

6. With the triumph of Communism, a classless society will appear and imperialistic rivalries among nations will disappear. There will be no need for government of any kind.

How the Communists Operate

TO SPEED THE REVOLUTION and insure Communist victory, Lenin, Stalin and their disciples have created a new system of morals and ethics. This system ranks the Communist Party's power above everything else—above truth, freedom, honor and life itself. The only right is that which strengthens the

Party, speeds the coming of the revolution and guarantees Communist triumph.

The Reds justify their methods by the aims they hope to accomplish. Here, in brief, are their methods:

1. Violence—Stalin put it on the line when he said: "A great many people seem to believe that we can build Socialism while we are wearing kid gloves. That is a great mistake, comrades." In fact, Party doctrine holds that too much violence is better than too little.

2. Agitation—The Commies believe the revolution is coming but they don't know exactly when. Constant agitation, therefore, does two things: (1) it speeds the day of revolution, and (2) it gives the Reds a yardstick for measuring the mood of the people and the rate of revolutionary advance. Agitation means keeping everything in an uproar, yapping about personal and civil rights, sowing suspicion and hate, and building up grievances and prejudices.

3. Liquidation of the Opposition—Lenin and Stalin agree on this: If a group breaks away from the Party line, you solve that problem by wiping out that group.

4. Discipline—Party members around the world give blind obedience to their masters in the Kremlin. They call this loyalty "democratic centralization." We call it iron rule. It means that decisions are made in Moscow and that Commies all down the line obey with fanatic zeal and without scruple. Family, morals, personal desires and ambitions, truth, honor and sentiment are brushed aside to build the power of the party.

5. The Fast Flip—Since the advance of the Party is paramount to everything else, there is no virtue in consistent conduct or logic. If a switch in the Party line strengthens the Party even temporarily, the Commies in Moscow and in your own home town do a quick about-face. It's brazen and unembarrassed.

6. Persistence—Since nobody knows—not even the Reds—*when* the revolution will break out, agitation and violence must be unrelenting. That's why the Party never rests, even after a tactical victory.

7. Infiltration—Nobody, not even the Commies, knows *where* the revolution will break out. That's why they bore their way into all kinds of organizations and activities. That way, they'll be on the scene when the revolution breaks. In their book, no job is too menial, no group too small or weak, no worker too lowly or undecided to exploit for the advance of the Party. There's only one reason why the Commies move into any organization, whether it's a labor union or the State Department—to strengthen the Party and advance Communism.

8. Selection of Targets—Labor unions are the primary targets of the Reds. There are three reasons for that: (1) unions are mass organizations of workers and the Commies believe the workers will lead the revolution; (2) unions, if shrewdly and unscrupulously led, can disrupt production in essential industries fast and effectively, paralyzing a nation's resistance to Communist attack; and (3) the minor everyday needs of working people—food, clothing and shelter—are a starting point from which to lead workers into a revolutionary struggle for power. That's why Moscow requires every Party member to join a labor union.

9. Rule by Minority—A well-organized minority group, like a Communist cell within a labor union, can control an organization completely if the interest of the majority group declines. That's how the Reds, though few in number, rule some unions by default. Also, a trained minority group, skilled in the conduct of meetings and the art of debate and public speaking, can snatch leadership of a union simply by maneuver and noise. The Commies are masters of that kind of power seizure.

10. Accusations and Slogans—The truth of a statement is no measure of its usefulness to the Party, the Communists believe. The only true measure of a statement's worth is its impact on the people who hear and read it. That's why the outbursts and accusations of a man like Vishinsky, though they seem hysterical, really are based on cold calculation. The hysterics are only stage dressing to enlarge the impact of the lies.

Likewise, the Party's use of slogans is carefully calculated to draw sympathy to the Communist cause and to lead unthinking people down the Commies' sawdust trail. They start out with slogans nobody, least of all a working man, wants to argue with. These starting slogans, to mention only a few, are words and phrases like "Peace," "The Right to Vote," "Tax Reduction on Low Incomes," "Equal Rights for All," "Free Speech," "Democracy," "Higher Wages," "Patriotism." Once people start following along, the Commies break into a new stage, which includes such slogans as "Corrupt Politicians," "Party Bosses," "Deceivers of the People," and "Dirty Capitalist." It's only a few more steps until misguided people, following the Reds further, are yelling, "Peace With Russia" (at what price?), "Free Speech" (for those who would overthrow our democracy?), "Wage Hikes" (to breed more inflation?), "Vote for a Change" (to bring Communism in?) and "You have Nothing to Lose But Your Chains" (exchange freedom for slavery?). It's all part of a carefully master-minded campaign for luring people along step by step to a final but irrational commitment to Communism.

How Communism Makes Men Slaves

IF THE REDS HAVE THEIR WAY, leading us down the road to Socialism, revolution and finally a Communist state, here's the iron rule you'll live under:

1. Your Job—You'll work where your masters tell you to work, as long as they tell you to work and the way they want you to work. Sure, you can be a "Labor Hero" in a Communist state. You can break your back setting a new production record, pin medals on your chest and hear a lot of big speeches about what a big wheel you are. You can even make some speeches yourself. But when you get tired of 16 hr a day in the mine trying to keep up with your record, tired of hearing and making speeches another 3 hr a day and tired of sleeping only 5 hr a night, you'll let up a little. That's when your masters will call you "Saboteur" and "Traitor." You'll disappear or die "accidentally" or "of natural causes," like some Russian "Labor Heroes." Or you'll be tried as a "Wrecker," like a recent Chinese "Labor Hero." Or you'll seek refuge where the Commies don't rule, like a recent Czech "Labor Heroine."

2. Your Wages—You'll take what the government pays you and you won't complain if it isn't enough to buy meat and potatoes. If you strike because you don't like your pay, you'll get another job, all right—in a slave-labor camp.

3. Your Home—You'll live in dread of a midnight knock at the door. In Communist countries, the secret police don't need a search warrant. If you complain

about living conditions, wages or the government, your son or daughter will turn you over to the secret police. The government will merge your garden into a collectivist farm, telling you what you may take from it and, without paying you anything, send the rest of the produce elsewhere.

4. **Your Newspaper and Radio**—You'll read and hear only what your Kremlin masters dictate. You won't know whether it's the truth or a pack of lies and there won't be any opposition party to bring out the truth. Even Li'l Abner, Maggie and Jiggs, Superman and the sports page will follow the Party line. You won't laugh much.

5. **Your Union**—Your union will be a tool of the government, ruled so as to strengthen the Party. It won't fight for your welfare.

6. **Your Living Standard**—Because the Commies aim to build arms for the inevitable war with Capitalist nations, the Red army will get lots of guns and planes. But you won't get much butter—or, for that matter, an automobile, a refrigerator or a wristwatch. You'll be lucky if you get enough coal to keep your house warm, even though you work in a coal mine. In short, you'll live like a Russian, not like an American.

7. **Your Church**—Chances are you won't have a church. If you do, the preacher will have to swear loyalty to the Party before he can preach. That means you'll listen to the Party line even in church.

8. **Your Civil Rights**—Sure, you can go to meetings in a Communist state. In fact, you'll have to. But they'll be meetings set up and run by the local commissar on orders from Moscow. You might even make a speech at one of these meetings. But it'll be the "right" kind of speech because the secret police will be listening. You may vote in these meetings. But you'll vote only one way—the Party way.

You'll vote in elections, too. If you don't vote, Uncle Joe won't like you. But there'll be only one candidate to vote for. You see, there aren't any Democrats or Republicans in Russia. There are only Communists.

You may get in trouble and go to jail. But you won't get a jury trial and your defense lawyer will only tell you how to word your "confession."

How to Spot a Commie

IT'S NOT EASY to spot a Red. Party members are trained for deception and evasion. They dress like other people. They use familiar words and slogans. They can look you in the eye while they stick a knife in your back.

The fact is, there's no one thing that's a dead giveaway for a Commie. You have to put a lot of things together before you can be sure. But after you've watched him carefully, gathered your evidence and are certain you can make the label stick, go after him.

Here are some Do's and Don't's about spotting Reds:

1. Don't look for uncombed hair and bristly whiskers. That's cartoonists' stuff.

2. Don't put the finger on a man because he argues with you or makes a loud speech in the courthouse square. Maybe you and he have an honest difference of opinion.

3. Don't think he's a Communist because he wants peace. Lots of good people want peace. But find out why he wants peace and what price he'll pay.

4. Don't call him a Red because he asks for more pay. He may be an optimist but that doesn't make him a Commie.

5. Don't turn him in to the FBI if he brings in a grievance. Find out the facts. He may have a just complaint.

6. Do get suspicious when he dodges your questions, kicks up dust in your eyes and goes into a noisy speech about other things, mostly name-calling and accusations.

7. Do keep your eyes open if he tries to undermine your faith or your workers' faith in our system of government or your company.

8. Do put your guard up if he magnifies the personal grudges and disappointments of others and tries to make big issues of them.

9. Do take decisive action if he yaps the way the Russians yap and if he flip-flops every time the Russians change the Party line.

10. Don't go off half-cocked. First, be sure you've got the facts to prove your case. Then go ahead.

How You Can Fight Communism

THE COMMIES ARE ALERT, shrewd, well-informed, well-organized and persistent. The only way to lick them is for you and other men who love your freedom to be equally alert, shrewd, well-informed, well-organized and persistent.

Here are some helps for you:

1. Bone up on Capitalism and its aims and methods. A smart Commie knows as much about Capitalism as you do, and probably more.

2. Study Communism. A good general learns as much about his enemy as he can before he joins battle.

3. Keep yourself and your workers informed about the economic facts of life. That way, you'll be equipped to argue the Reds down and resist their propaganda.

4. Challenge every rumor and accusation of injustice with a demand for the facts.

5. Give your men a square deal in wages and living and working conditions. Create a climate around the mine and in the community that Communism can't thrive in. That means building up mutual respect between workers and management, strengthening pride in the job and the company and showing your men that you have their interest at heart.

6. Urge your workers to attend their local union meetings. If a Commie infiltrates the local, help the union run him out.

7. Take every opportunity to show your men how they profit under Capitalism.

8. Guard against employing trouble-makers and chronic complainers.

9. Keep loiterers off your property.

10. Report suspicious persons to the FBI. There's an FBI office in the nearest big town.

The Commies are the largest, most active and noisiest group in trying to exalt the power of government and destroy the freedom of the individual. Thus, for Americans, they are Target No. 1.

But—and this is a big but—wiping out the Communist party as such is not the end of the matter. The fact is that any thinking, any party or any group—no matter how well-intentioned—that urges greater government power over the individual is setting the stage for the end of freedom. That's exactly what the Reds want.

The key to freedom is a clear understanding of what freedom means and a firm resolve to work to preserve it.



AUGERING IN PROGRESS, with helper attaching pull chain to dead string. Two chucks and a square bar drive augers.

What Consol of Ky. Has Found in Experimental . . .

Auger Mining Underground

CONDITION: Thin Coal and Bad Drawslate
GOAL: Practical Low-Cost Mining Method
EQUIPMENT: 25-In Auger Drilling 100 Ft Deep
RESULTS: Up to 30 Tons or More per Faceman

By JOHN K. BERRY
Production Engineer, Consolidation Coal Co. (Ky.), Div. Pittsburgh Consolidation Coal Co., Jenkins, Ky.

COAL 32 in high, very-bad roof and 10 in of soft drawslate that comes down as a cut is shot add up to a seam unmineable at a competitive cost, no matter what the quality of the coal. However, recent experiments with underground auger mining show promise for the development of a system of mining for areas such as this that would result in profitable operation as the more easily mined seams are exhausted.

The experiment with which this article deals was conducted in the upper split of the No. 3 Elkhorn seam, near Myra, Ky., in Pike County. The coal is exceptionally high-quality metallurgical. Several entries were developed in 1948 with shaker conveyors in the hope that the seam could be mined clean and a high face cost offset by practically no general mine or preparation cost. The soft drawslate made this



OPERATOR'S SIDE of the auger. Controls will be moved the opposite side of the machine to facilitate auger changes.



HEAD IN ACTION on Kelly bar and split bearing on A-frame, which facilitate exact positioning of head.

impossible, and the entries were abandoned after being driven in a short distance.

One set of entries, driven in around 700 ft, was selected for the test. Old crossbars were removed in the lefthand heading, and roof, much of which already was resting on the broken headers, was taken to a height of about 50 in. Then the top was bolted.

AUGER DESIGN

A Cardox-Hardsocg underground coal-recovery drill or, more simply, "The Auger," for which the preceding preparations were made, was then towed to the face on easily detachable rubber-tired wheel mounts by shuttle car. Later, when no shuttle car was available, and the unit was to be taken to Cleveland for the Coal Show, it made the same trip out and back under its own power. Using the drive chuck as a capstan, it pulled itself along with 200 ft of ¼-in wire rope attached to a jack.

The auger is 24 in high, 10½ ft long in the drilling direction, and 6 ft 4 in wide. The weight is 8,000 lb. It is powered by a 25-hp permissible motor driving through a fluid coupling. A clutch, forward-and-reverse gearbox, chain drive and square bar deliver the power to the drive-chuck transmission, which travels 6½ ft along the square bar as the head is pushed into the coal. Rotation speed is 45 rpm. There is a drive chuck on each side of the transmission. By reversing the transmission and using a second set of augers with reverse scrolls to deliver the coal on the outby side, drilling can be done both ways from the same set-up.

The motor also drives a hydraulic pump for furnishing 1,000 lb of thrust or pull on the drive chuck, engaging or disengaging the clutch, operating the gear shift and raising and lowering the four floor and three roof jacks. The floor jacks are necessary to position the head the proper distance from the top and bottom of the seam and at the correct angle. The roof jacks hold the machine rigid and prevent shifting out of line. Needle valves lock the jacks once the machine has been set.

Exact placing of the head (of which more later) is so urgent that a hinged A-frame with a split hinged bearing support was added on the end of the machine to hold a "Kelly bar" between the drive chuck and the head. This permits starting the hole exactly where desired. Once the head is in the coal, the Kelly bar is removed and replaced by an auger section. Then, the A-frame is swung out of the way and drilling commenced.



COJONES on rear rim of cutting head solved problem of controlling direction.



OPERATING MECHANISM includes chuck transmission and double chucks (right).



LUMP HEAD with center bursting cone and pilot drill in hole.



HOLES look like this after augering. Diameter is 25 in.

For moving from hole to hole, two pairs of small double-flanged rollers are installed on the bottom of the auger. Two short light rails are placed under the rollers while the machine is still raised on the jacks. The jacks are collapsed and the machine rolls by gravity to the next hole if the inby rails are blocked up slightly. If the auger should get seriously out of parallel for any reason during moving, or if it is necessary to turn 90 deg or more, a roller-bearing turntable on the bottom of the machine is used. By placing a block under this turntable, the machine can be spun around by hand.

A puller bar extending the approximate distance of the hole centers is bolted to the drive-chuck mechanism. It may be removed during long moves. A hook and chain permit coupling to the string of augers in the completed hole. By using a second drill head, the string may be recovered one section at a time and used in the new hole as it is drilled.

PRODUCING COARSE COAL

The drilling head is of the so-called lump type and consists of a cylinder 25 in in diameter with 15 steel bits in three positions spaced around the forward rim. A conventional coal-drill bit—at the head of a bursting cone in the center of the cylinder—trails the forward rim slightly. The cone and auger sections are anchored to the cutter barrel by means of two half scrolls or three arms spaced at 120 deg. Greater strength of head and less choking of coal flow have been obtained with the latter.

A screen test on a coal sample from this head is as follows:

How Auger Is Operated and Controlled for Best Results



FLAT COLLECTING PAN on end of shaker takes coal from auger.



PULLER BAR recovers auger sections for use on live string.

8x5-in.	13.09%
5x3	10.60
3x1	21.95
1x¾	4.29
¾x⅜	11.89
⅜x⅛	13.80
⅛x0	24.38

Results like this, however, are obtainable only when cutting at full speed. If, because of dull bits or low pressure, the drilling rate is slowed substantially, there is a heavy transfer from the 3x⅛ to the ⅛x0 fraction. The plus 3-in is affected only slightly.

Auger sections 24 in in diameter are 6 ft long, plus the connecting shanks. The shanks are round-tapered with a pair of jaws for driving. The taper eases connection, provides rigid alignment under pressure, and facilitates disconnection when the pressure is removed. Loose-fitting jaws transmit the torque. A loose-fitting hole through the male and female connections accommodates a spring-clip pin, inserted or removed by a hammer blow and serving only to hold the auger string together when being pulled out. There is no pressure on the pin while drilling. The connections are made of cast manganese steel to prevent burring or wear.

The auger at present delivers its coal to the mouth of the hole on the side of the direction of rotation. On highwall drills, a little bottom can be taken to permit the insertion of an elevating conveyor to catch and collect the coal. Underground, however, taking bottom is not always possible and equipment of suitable size is a problem. For these reasons, it was decided to use two shaker conveyors in tandem for the experiment. The pan line was laid along the left rib and a flattened collecting pan was attached to the end of a telescoping trough section by the use of C-clamps.

The flattened head, equipped with lagged liner plates, passes under the auger sections, taking very little height, and removes the coal from the scrolls before it has traveled more than a foot or two. As each hole is completed, the pan line is retreated until all the coal has been drilled.

DRILLING CYCLE

With the completion of a hole, rails are placed under the rollers and the auger is rolled to approximately its new position. The exact location is determined by two marks on the roof at right angles to the center line of the place and 32 in from the center of the previous hole, leaving a 7-in pillar between. The A-frame is swung into drilling position and the Kelly-bar installed. Position under the roof marks is checked by a plumb bob and any final shifting is done. Then the floor jacks are lowered to hold the machine.

The cutter heads are put on the Kelly bar and the telescopic trough is shaken back until the collecting pan extends slightly past the center of the head, where it is clamped.

The operator then uses the floor jacks to locate the head properly in the seam. At this point, the helper uses a carpenter's level and a steel wedge graduated in ½ deg to determine when the machine is set at the correct angle. The floor jacks then are locked by the needle valves and the roof jacks are set and locked.

The operator now disengages his clutch, puts the machine in gear, engages the clutch and drills the length of the head into the coal. The Kelly bar is removed, the A-frame swung out of line, and an auger section is inserted. This section is fed in the full stroke of the drive chuck. Meanwhile, the helper has connected the pull chain to the string of augers in the previous hole. When the section is drilled in to the limit, the pin is knocked from the drive-chuck connection and the chain is hooked to the puller bar.

The retreating drive chuck pulls the dead string of augers to within 6 in of its full stroke. The helper knocks the pin connecting the last section to the string and it is pulled loose, rolled into position, inserted in the last auger and the drive chuck moved to the other end. The operator is needed to assist the helper in making this connection. With the present machine, the controls are on the far side. Consequently, it is not convenient for the operator to assist. Therefore, his place has been taken during this one operation by the time-study man. The controls, however, are being moved to the drive-chuck side, which will make the operator available. After insertion of the new auger section, the locking pins are driven and drilling starts again.

CONTROLLING DRILL DIRECTION

On any outside highwall drilling, length of hole has not been too great a consideration, except for reduction of moves. After profitable coal production in the original stripping, anything extra from auger mining is gravy, with no charges against it other than operating labor and incidentals.

With underground auger mining, however, the quantity of coal recovered from a panel is highly important, since the cost of developing the entry and setting up the transportation must be charged against it. Therefore, if only 50 ft of hole is drilled when the head

goes into the top or bottom, the preparatory cost will be double that where 100-ft holes are possible.

All heads tried showed some tendency to drift to the right, but this was unimportant since the curves tended to parallel each other. The first lump heads, however, showed an alarming tendency to drop in an accelerating curve, ending up in the bottom at 40 to 50 ft even with the maximum upward angle short of penetrating the roof.

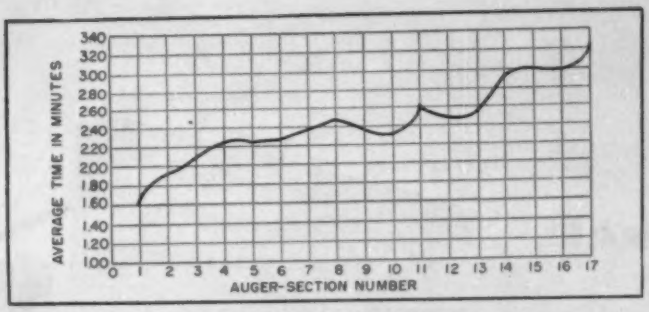
Once the head was well started in the coal, no means was found of influencing its direction, either by fast or slow drilling or by changing the elevation or angle of the machine. Levels were run on the top of each hole—to discount the effect of auger-string abrasion on the bottom—and the results plotted on a graph. The similarity, while discouraging, at the same time gave hope for a like similarity when the answer was found.

As a result, F. B. Baca, of the Cardox-Hardsocg organization, took the head back to the plant where it was redesigned by placing a series of lugs, known as "cojones," in a circle around the rear rim of the cylinder. These acted as a fulcrum for the weight of the auger string, levering the head up. Previously, the weight rested on the bottom bits, forcing the head down. Initial results were too good and the head regularly climbed into the top. By gradually reducing the size, the right diameter was found, enabling the head to stay in any plane in which it was started. A further improvement was made by replacing the solid cojones, which seriously reduced drilling speed, with rolling ones. Now, holes 90 to 115 ft deep are the rule at the same rates attained with the original head.

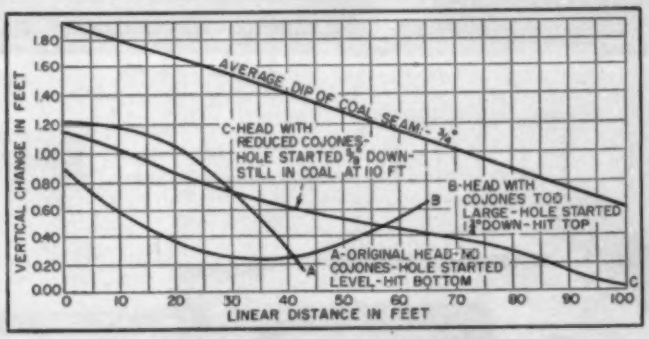
AUGER RESULTS

No attempt has been made as yet to go all-out for production. With only 700 ft of entry prepared—at quite an expense—it was felt that complete and accurate information would far outweigh a few extra tons per day. As a result, levels were run on all significant holes as soon as they were drilled, and all possibilities were explored.

Time studies have been made, however, on a substantial number of holes, permitting some forecast as to what might be expected. The accompanying chart shows the average drilling time for 102 ft, broken down by auger sections. The gradual increase in drilling time explains why power requirements remain at around 125 amp at 260 v in spite of the greater weight of augers and coal being handled.



HOW DRILLING SPEED IS AFFECTED by adding auger sections.



EFFECT OF COJONES on vertical control of drilling head.

Two men, once the operating controls have been moved to the drive-chuck side, appear to be the standard face crew. A selected average of the time studies shows the following:

	Minutes
Move from previous hole, including pan, head and Kelly bar	15.00
Level and lock machine	5.00
Start head 2 ft, remove Kelly bar and insert auger	7.00
Drill 98 ft (0.409 min per ft)	40.00
Retrieve and insert 16 augers, (1.10 min per change)	17.60
	84.60
Plus 10%	8.46
Total	93.06

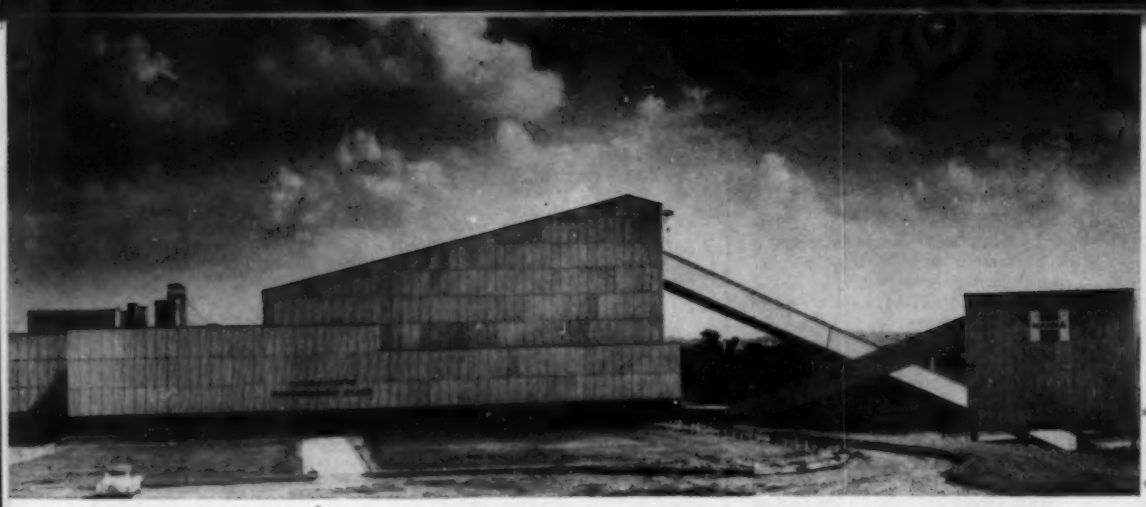
Assuming 420 min at the working face, this would result in 4.52 holes per shift. At 13.6 tons per hole, the production would be 61.5 tons per shift, or 30.75 tons per faceman.

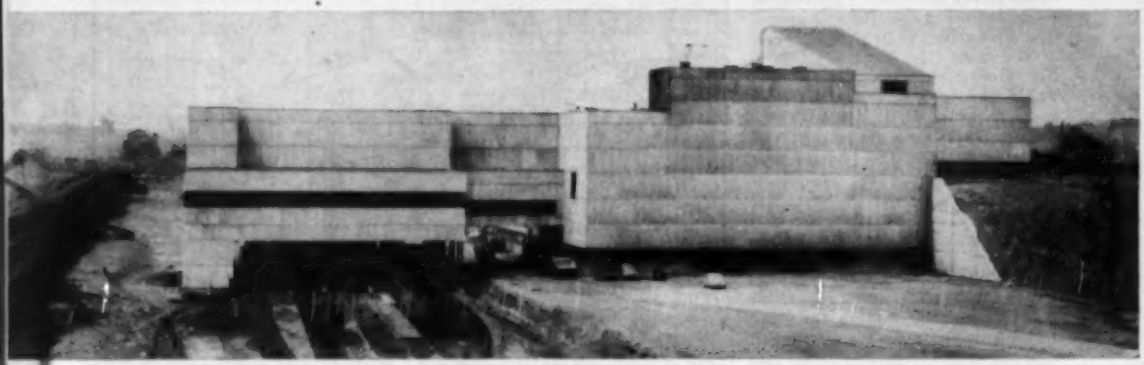
If holes can be drilled on both sides of a heading, in addition to double the tonnage to spread development costs over, moving time is cut in half, resulting in an average time of 84.8 min per hole, including delay allowance, or 4.95 holes per shift for 67.4 tons.

Recovery, assuming 25-in holes drilled on 32-in centers in 32-in coal, calculates out to 48%. If, however, 100-ft holes are drilled on both sides of an 18-ft entry, and the entry coal is recovered during development, the recovery percentage rises to almost 53%.

For the right conditions, it looks as if "The Auger" has good possibilities. There are several problems yet to be solved, however. A suitable method of elevating the coal for delivery to the transportation system, while being studied, is yet to be evolved.

The proper equipment for developing room entries is yet to be decided also. It will be an expensive program for the upper split of the No. 3 Elkhorn—a cost that will have to be carried by the auger-mined coal. On the ability to hold this cost within reasonable limits, and on the ability of the auger to recover sufficient coal from a given block over which to spread this cost, hangs the future outcome of this experiment.





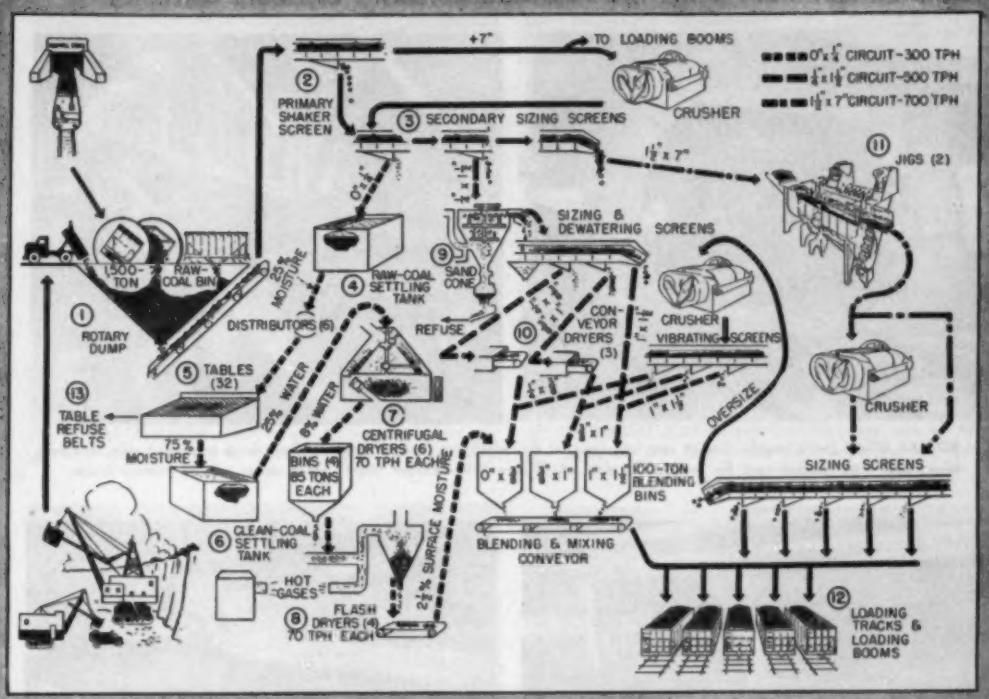
NEW GEORGETOWN PREPARATION PLANT, as seen from north and east (top and bottom, respectively), is the largest plant in the commercial bituminous industry. Designed for automatic operation, the plant receives 1,500 tph, feed, and produces 1,275 tph, clean coal.

How Three Separate Cleaning Circuits Concentrate Btu's at . . .

Georgetown Preparation Plant

- Twin Two-Stage Washers, Large Sand-Flotation Cone, 32 Concentrating Tables Clean Three Splits of Raw Feed in Separate Circuits
- Dewatering Centrifuges, Heat Dryers, Versatile Blending Equipment Complete Preparation of Custom-Made Fuel at Rate of 1,275 TPH
- Refuse-Handling System Features Complete Belt-Conveyor Transportation and Effective Dewatering

COSTING MORE THAN $5 MILLION and requiring 2 yr to build, the new Georgetown preparation plant, officially opened July 31 by the Hanna Coal Co., is the largest coal-cleaning plant in the commercial bituminous industry, and is the latest completed project in Pittsburgh Consolidation Coal Co.'s 5½-yr $80-million modernization program. Located 2 mi southeast of Cadiz, Ohio, in an attractive setting that includes a man-made 65-acre lake, the new facility receives 1,500 tph of raw coal from Hanna's large strip mines in Harrison, Jefferson and Belmont counties and from some of the company's deep mines in Ohio. Clean-coal output is 1,275 tph.



THREE SEPARATE CIRCUITS feature efficient cleaning units for each of the size fractions into which the feed is split. Circled numbers in the flow diagram refer to numbered photo captions on the following pages. Figures in parentheses denote number of units installed.

In the cleaning process, which actually is a process of concentrating Btu's by eliminating low-heat high-ash material from the raw feed, the coal is upgraded in heating value from a range of 10,000 to 12,000 Btu per lb for raw coal to about 13,000 Btu per lb for clean coal. The removal of refuse, ranging in volume from 10 to 30% of the input, reduces the ash content of the clean product to 7% or less. Quality of the final product is further increased by dewatering and drying units, some commercial and others Hanna-designed, which reduce surface moisture in the smaller sizes to as low as 2½%.

How the Cleaning Problem Was Approached

PRELIMINARY STUDY which preceded the design of the central preparation plant demanded consideration of several washing and drying problems as follows:

1. High-ash clay fines tend to concentrate in the minus ¼-in size, and particularly in the minus $\frac{1}{16}$-in fines.

2. A considerable amount of banded material in coarser sizes presents the problem of high coal loss in the refuse.

3. A quantity of bony material in the 1½x¼ requires close gravity control for best cleaning results.

4 The large quantity of coal to be processed in the plant influences the selection of cleaners and auxiliaries and the layout of cleaning circuits.

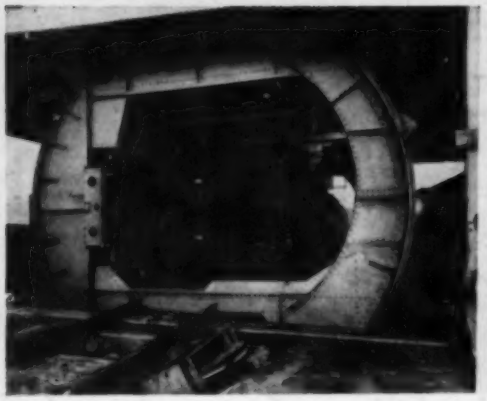
5. The raw-coal feed often is wet, thus complicating the screening of fines.

The completed plant features equipment to overcome each of these cleaning problems, as follows:

1. The high-ash fines in the feed are removed with the ¼x0 at the secondary sizing screens, as shown in the flowsheet, and deposited with this fraction in a specially-designed settling tank. The 72-ft wide concrete tank has an effective settling length of 50 ft, an overall height of 84 in and is filled with water to a depth of about 72 in. In the tank are six chain conveyors equipped with flights 8 ft wide and 15 in high set 3 ft apart on the chains. The tank, which was conceived by Hanna personnel, serves the double purpose of (a) reducing the moisture of the raw coal discharged by the chain conveyors to about 25%, and (b) eliminating the high-ash clay in the form of minus 100-mesh fines in the tank overflow. About half of the overflow is recirculated as flush water to the classifying screens, and the remainder is diverted to a 300,000-sq-ft settling basin for clarification and later reuse in the plant.

2. The next major problem—low-

Job-Rated Auxiliary Units Increase Georgetown's Cleaning Efficiency





1 ROTARY DUMP (left) empties loaded cars into raw-coal bin, which also receives strip coal from dump trucks and strip- and deep-mined coal from railroad cars. Bin feeds 60-in wide, 641-ft long belt conveyor (right) which moves coal to primary shaker.



4 CONCRETE SETTLING TANK receives raw fines and water from sizing screens and discharges feed to table distributors.



5 CONCENTRATING TABLES, 30 in service and two spares, reduce ash content of 300 tph of 0x¼-in fines to 7% or less.

er-quality streaks in the coarser sizes—is met by providing hand-picking facilities for plus 7-in material when that size is loaded, and the selection of McNally Mogul jigs for cleaning the 7x1½-in size. These units provide a middlings product which is crushed and recirculated, thus permitting removal of the bands from smaller sizes. Most of the plus 7-in coal also is crushed and recleaned.

3. For removing near-gravity bony material from the 1½x¼ raw coal, a 16-ft 6-in Chance cone was selected because close control of the gravity of separation is a feature of the sand-flotation process.

4. Considering the quantity of coal to be processed, it was realized that multiple units would be required for many operations in the plant, and that, therefore, different types of cleaners could economically be employed for each of the three sizes. The three claning circuits now include: (a) a battery of 32 Deister SuperDuty Diagonal Deck concentrating tables (30 operating and 2 spares) for cleaning 300 tph of ¼x0; (b) the Chance cone for cleaning 500 tph of 1½x¼; and (c) two McNally Mogul jigs for cleaning 700 tph of 1½x7.

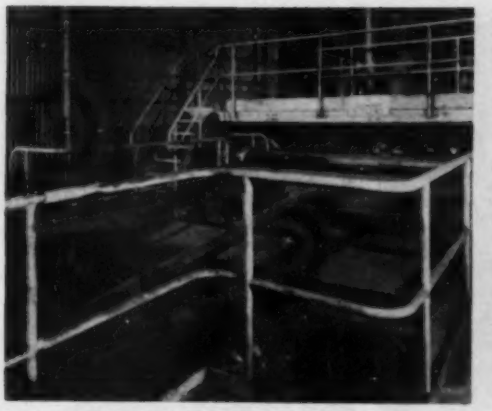
5. The wet condition of the raw feed precludes dry-screening of fines. Therefore, two 8-ft wide shaking screens with a total screen-area of 700 sq ft receive the raw coal and 4,000 gpm of flush water. The lower deck of the shaker, which is jacketed with stepped, slotted plate equivalent to ¼-in round, passes the minus ¼-in fines and most of the screening water to the concrete settling tank previously mentioned.

These, then, are the five major cleaning problems attributable to the nature of the feed and Hanna Coal's approach to the solution of each. A more detailed description of the plant, with emphasis on dewatering and drying, follows:

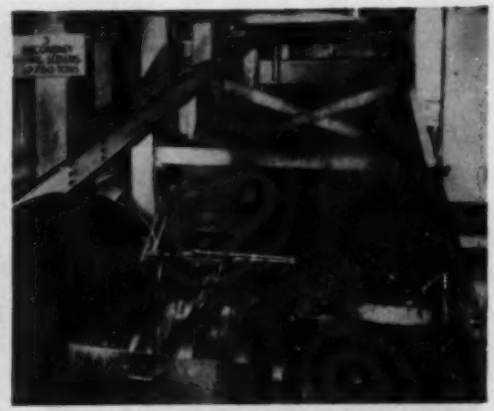
Three Separate Circuits —Custom-Cleaned Coal

THE GEORGETOWN PLANT features three distinct circuits—the table circuit, the sand-flotation circuit and the coarse-coal jigs.

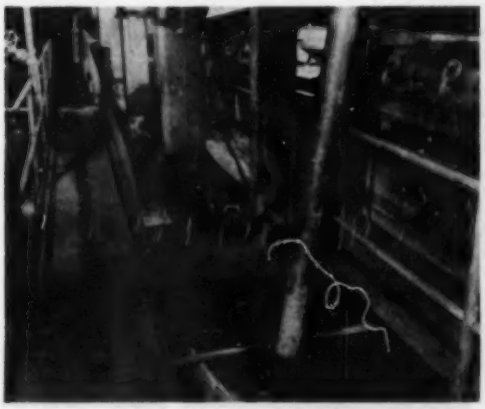
Feed for the tables is discharged from the concrete tank by the chain conveyors and directed to six distributors, each of which splits feed



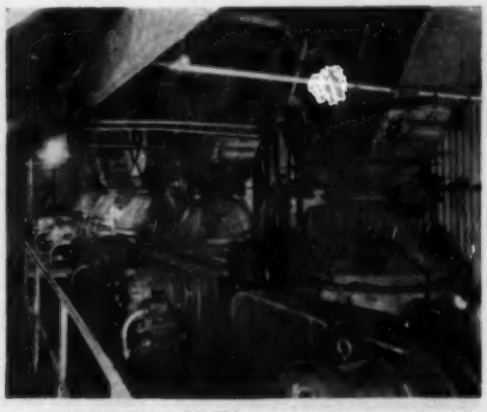
2 PRIMARY SHAKING SCREEN scalps plus 7-in material for direct loading on demand or for crushing to minus 7-in for cleaning.



3 SECONDARY SCREENS split feed three ways: 0x¼ for tables, ¼x1½ for sand flotation and 1½x7 for coarse-coal washers.



6 CLEAN COAL SETTLING TANK reduces moisture in table product from 75% to 25% as the initial step in dewatering.



7 SIX CENTRIFUGAL DRYERS, rotating at 750 rpm, mechanically cut moisture of fines from 25% to 8% for thermal dryers.

among five tables. A measure of cleaning efficiency in the table circuit is the fact that fines, once regarded as the poorest coal product, now is the best product of the plant from the standpoint of heating value. Ash content of the table-circuit feed ranges from 12 to 20%, while the ash in the table product is 7% or less. Subsequent drying of the table product reduces surface moisture to about 2½%, thus providing customers with savings in freight charges and higher burning efficiency.

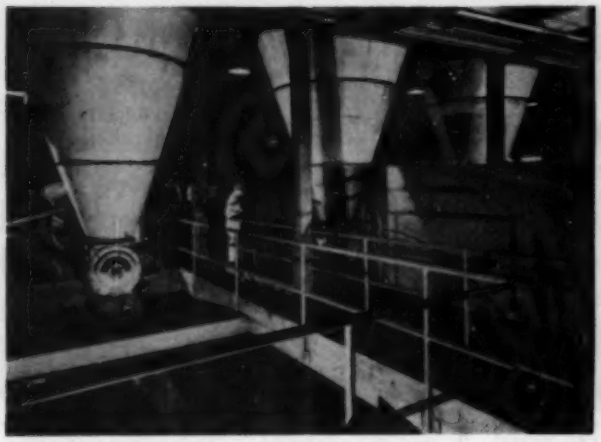
Clean coal discharged from the tables (about 75% water) is flumed to another settling tank, locally designed, which is 60 ft wide and has a settling area of 4,200 sq ft. About 3,000 gpm of water enters the tank and the clarified overflow is recirculated to the tables as feed water.

Six drag conveyors, with 6-ft wide flights, move thickened clean coal with about 25% surface moisture to a battery of six Reineveld centrifuges, where the ¼x0 clean-coal slurry is mechanically dewatered to about 8% surface moisture. Normally, each drag conveyor discharges to a single centrifuge, but chutes and swing gates make it possible to direct the total, or any part of a conveyor's discharge, to the centrifuge on either side. Effluent from the centrifuges, which carries a circulating load of from 10 to 12% solids, returns to the settling tank and is recirculated through the centrifuges.

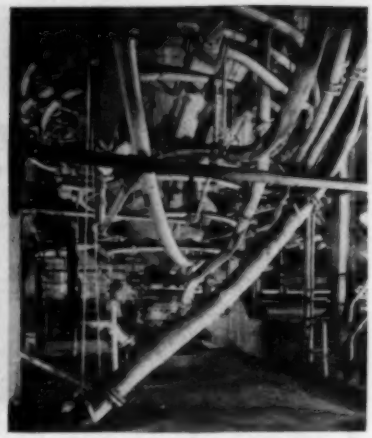
The next step in the fine-coal process is thermal drying. Four Raymond flash dryers, each with a 30-ft-high column and 12-ft-diameter cyclone served by flue gases from a companion furnace, reduce surface moisture in the mechanically-dewatered coal from 8% to about 2½%. The temperature of inlet gases is about 1,200 F, and temperature of the product is about 110 F. The product of the flash dryers is conveyed to one of three 100-ton blending bins, which feed a blending conveyor serving the track-loading booms. The combination of blending bins and conveyor provides for loading various sizes, or combination of sizes, on any of the five loading tracks.

Efficient loading equipment permits 2-min loading of railroad cars, and each car is automatically weighed and entered in Hanna

Hanna Coal's New Plant Keeps Streams Clean and Air Fresh



8 FOUR FLASH DRYERS entrain 8% moisture fines in hot gases to provide a final product having about 2½% surface moisture.



9 SAND FLOTATION cleans 500 tph in 16-ft 6-in cone for removal of low-quality bands.



11 TWO 350-TPH WASHERS clean coarse coal in two stages and provide middlings for recleaning.

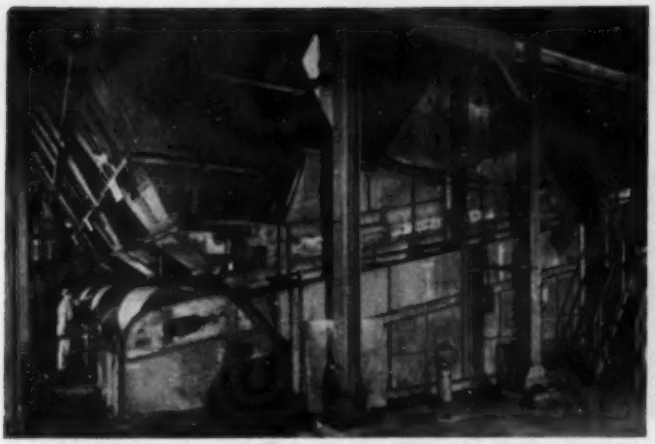


12 FAST WEIGHING is electronically controlled and train make-up is speeded by electric switching from weigh station.





13 DEWATERING TABLE REFUSE—Primary belt (left), dipping away toward low point, carries solids in center and water along sides. Final table-refuse belt (right) carries solids along high side as water runs back over tail pulley (out of photo at right).



10 HANNA-DESIGNED conveyor-type heat dryers carry stoker sizes from sand-flotation cone through stream of clean hot gases on woven-wire belts.

Coal's accounting system by IBM electronic equipment. About 21 mi of track serve the plant, providing storage room for more than 800 cars. Two railroads—Nickel Plate and Pennsylvania—haul the coal to market, which includes industries, utilities and dealers throughout Ohio and the Great Lakes area.

In the sand-flotation circuit, the ¼x1½-in size is chuted from the secondary sizing screens to the 16½-ft Chance cone. Float material from the cone is desanded, dewatered and split into three fractions—¼x⅜, ⅜x1 and 1x1½. The 1x1½-in fraction is stored in one of the blending bins without drying, but the two smaller fractions are thermally dried on three woven-wire belt conveyors designed by Hanna Coal Co. personnel in collaboration with Allen & Garcia.

Each of these dryers consists of a traveling woven-wire belt 6 ft wide with 144 sq ft of drying area under the drying hood. Distance between pulley centers is 28 ft. Hot down-draft gases pierce the bed of coal on the conveyor under the drying hood. The hood is divided into two sections, the first section designed for mechanical dewatering and utilizing the exhaust gases that are recirculated from the following heated section. Clean gas—not exhaust gas—from the Raymond dryers is used in the process to preserve the dustless character of the cone-cleaned coal. Products of the heated conveyors are directed to the other blending bins, as shown in the flowsheet.

In the coarse-coal circuit, the 1½x7-in feed is subjected to a two-stage cleaning process in the McNally Mogul washers. Refuse is removed in the first stage, while coal and middlings are separated in the second stage. Coal and excess water float over the end partition to dewatering screens, and middlings are raised to a crusher for retreatment in the appropriate circuit to remove banded impurities. Natural drainage removes sufficient moisture from the larger sizes.

How Refuse Is Handled

ALL REFUSE is moved on belt conveyors. Unusual equipment for dewatering table refuse is installed, consisting of two 48-in belt conveyors traveling at from 5 to 6.4 fpm. The belts which are inclined toward the center from each end, making low points where the water accumulates, are deeply troughed. Solids pile up in the center and water that accumulates on each side is drained off over the side of the belt, the discharged water being practically clear.

The two table-refuse belts discharge to a third 60-in belt inclined from 4 to 10 deg and traveling 13 fpm. Additional water drains back over the tail pulley of this secondary dewatering belt, reducing the moisture in the fine refuse to a point far below that usually obtained by other methods of dewatering. The 60-in belt discharges the fine refuse onto a 48-in final-refuse belt. The fine refuse is discharged onto this belt after it has received the refuse from the jigs and the cone, as well as the ash received from the furnaces.

The main refuse belt discharges to a truck hopper outside the plant, from which trucks haul the waste to worked-out strippings. The crushed refuse is buried in the pits in the normal course of strip-land reclamation, thus eliminating the possibility of gob-pile fires, although it is believed the crushed refuse would not burn in any case.

Where the Plant Meets the Public

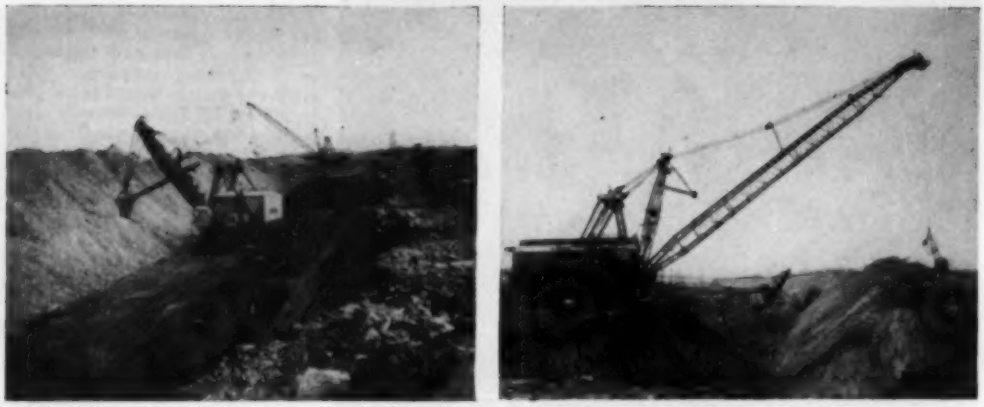
ENGINEERED AND BUILT by Allen & Garcia Co., the new 5-level 115-ft-high structure is a striking example of modern, functional industrial design, as shown in the accompanying illustrations. Among other up-to-date features, it includes a central control station and radio-telephone communications with the administrative and maintenance departments of the company.

With regard to gases and water discharged by the plant, every effort has been made to condition these by-products of the cleaning process to prevent air and stream pollution.

Exhaust gases from both the Raymond flash dryers and the conveyor heat dryers are passed through a 27x72x60-ft settling chamber, also a Hanna idea, at the rate of 300,000 cfm. The gases are introduced at the bottom of the chamber and ascend the 60-ft height at a rate of about 175 fpm. A battery of high-pressure fog nozzles, installed at the top of the chamber, blanket the entire volume of the chamber with a falling spray of water, which consumes from 200 to 300 gpm in suppressing the dust in the drying gases. The scrubbed gases then are released to the atmosphere. The clean exhaust and the prevention of gob-pile fires practically eliminate air pollution.

The water circuit was designed to prevent stream pollution. Make-up water from the lake—a reservoir of 240 million gal—is clarified and recirculated after treatment in the two settling chambers, as mentioned, and in a large auxiliary settling basin near the plant. As a result, the plant does not drain into nearby streams and the only losses are through evaporation.

For the customers, the plant produces an improved and uniform-quality coal with guaranteed low ash and low moisture, dustproofed when desired, and classified or blended into the sizes found most desirable for specific uses.



MODIFIED PARALLEL-TANDEM SYSTEM increases shovel operating time. Shovel (left) takes a 40- to 45-ft cut operating on a fill to bring it up to coal level. Dragline (rear and right) temporarily in the same end of the pit, takes a 95-ft cut.

Maumee Refines Tandem Plan

Latest Modification of Maumee-Developed Parallel-Tandem Stripping System Meets Problem of Deep Overburden With Sizeable Portion of Soft Material—Full Working Time for Shovel the Goal

FULL WORKING TIME for the shovel as well as the dragline is the goal in a recently introduced modification of the parallel-tandem stripping system pioneered at the Chieftain No. 20 mine of the Maumee Collieries Co., Riley, Ind., to meet the problem of deep overburden containing a sizeable percentage of soft material and thus subject to sloughing.

This new parallel-tandem stripping was the subject of a description appearing in the Janury, 1951, issue of *Coal Age*. Equipment involved is a Bucyrus-Erie 1150 B dragline, with 215-ft two-position boom, and a Marion 5480 shovel with 90-ft boom, 66-ft dipper handle, and 18-cu yd Amsco dipper. With the boom at an angle of 42 deg, the dragline is designed to swing a 25-cu yd bucket; 25 deg, 20 cu yd. Both buckets are Page Automatics.

The original parallel-tandem plan is shown in Fig. 1. It involved a center-opening pit, with loading in one end and stripping in the other. The plan was set up for the shovel to follow the dragline, digging approximately 40% of the bank, with emphasis on the hard material, and spoiling as indicated. The dragline benched off ahead and removed the remainder of the overburden down to the coal, dumping over the shovel spoil as shown. Advantages of this plan included elimination of the key cut for the dragline and apportionment of a large share of the harder material to the shovel, considered the better tool for this material.

MORE SHOVEL TIME SOUGHT

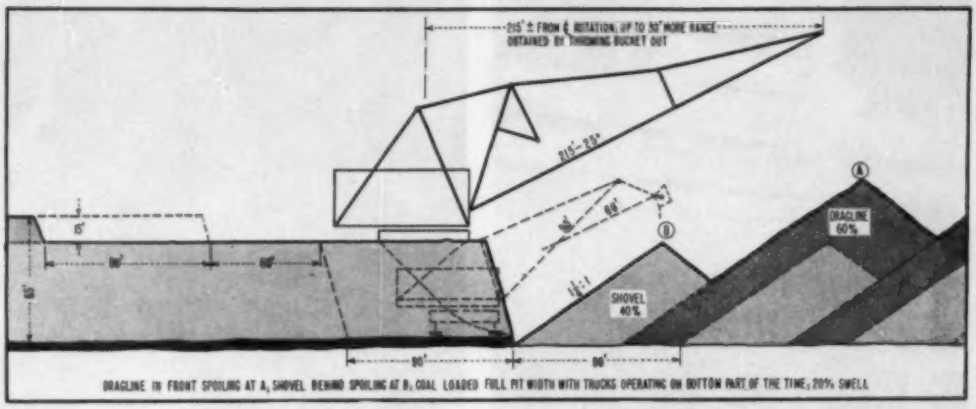
The big disadvantage of the original parallel-tandem system was the necessary limitation on shovel operation. It seldom was able to operate more than 75% of the available time. Therefore, while the original system still is considered the best under the conditions encountered, modification was sought to better utilize the capacity of the shovel. This modification, worked out primarily by E. A. Brinton, superintendent, with assistance from other Maumee officials, was in two stages.

In the first stage the plan was to leave a narrow coal berm along the highwall to give the trucks the added advantage of coal to run on. This, however, limited the range of the dragline, and thus made it difficult to spoil while taking the desired width of cut. Consequently, the plan shown in Fig. 2 was adopted, again providing for complete loading of the coal to the toe of the highwall.

SHOVEL PRECEDES DRAGLINE

Under the modification illustrated in Fig. 2, the coal, as noted, is completely loaded out and the shovel precedes the dragline. With a pit width of 95 ft, as left by the dragline, the outside crawler of the shovel is set 45 ft from the toe of the dragline spoil. The shovel fills in ahead of itself with slate and rock to bring it up to coal level, and then takes a 40- to 45-ft cut, spoiling on a slope of nearly 1:1 against the old dragline spoil. The coal in this cut then is completely loaded out in readiness for the next cut by the dragline, which is deadheaded to the starting point at the center of the pit.

Under ideal conditions the shovel normally is going north in the north end of the pit while the dragline is going south in the south end, and vice versa. Thus, loading can be done without interference in either end behind either the shovel or dragline. However, because the south end of the pit is shorter, both



ORIGINAL SYSTEM FIG. 1—FIRST PARALLEL-TANDEM PLAN was based on shovel and dragline both working on the same cut, with the shovel handling a large part of the hard material. The two halves of the pit were stripped alternately.

units occasionally are worked in the same end, which was the situation when the accompanying photos were taken. At this time, also loading was being done between the shovel and dragline, necessitating keeping the shovel down during the loading shift.

EXTRA BENCHING REQUIRED

Because the shovel now takes an independent cut the full depth of the high wall, the dragline is forced to bench an additional width equivalent to the shovel cut, or 95 plus 45 ft. It has encountered no difficulty in making this extra cut and spoiling the material.

An advantage of the new plan is the better base for the dragline spoil and the elimination of part of the time formerly devoted to preparing a good base. This arises from the fact that the fireclay under the coal, 6 in to 3 ft thick and carrying seepage water, would slide under the full weight of the spoil, resulting in an unstable pile. Consequently, the dragline was forced to dig out this fireclay—a time-consuming and unproductive task.

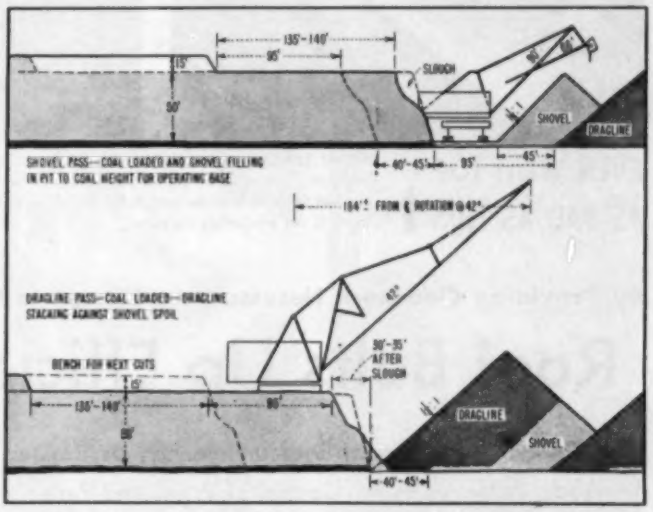
Now, since the shovel lays down a base of good rock part way across the area where the dragline spoils, the dragline is relieved of part of the job of digging out the fireclay and has a stable base to spoil on. Consequently, spoil-pile slides have been largely eliminated.

HIGHWALL SLIDES A PROBLEM

Slides on the highwall side, however, are a constant problem, and, consequently, the practice is to load out a strip next to the highwall as soon as possible to reduce cleanup operations. The tendency to slide is a result of the nature of the overburden, which contains a substantial proportion of soft water-bearing material toward the top.

This soft material also complicates dragline operation, since it results in slopebacks of as much as 30 to 35 ft rather than the normal 15 to 20 ft, thus requiring the dragline to set back and reducing its disposal range accordingly. The excessive slopeback, as a matter of fact, was responsible for discontinuing the use of the narrow berm provided in the original parallel-tandem modification. Loading out completely provides the necessary spoil area within the dragline's reach, though there is little to spare.

As a result of the latest modification of the parallel-tandem plan, even though it requires the dragline to handle considerably more hard material, the shovel is utilized more of the available time and yardage moved per month has been increased substantially, Maumee officials point out.



LATEST SYSTEM FIG. 2—MODIFIED PARALLEL-TANDEM PLAN provides separate cuts for shovel and dragline, increasing shovel time.





EVEN WITH TOP AS BAD AS THIS ↑

TYPICAL EXAMPLE of the weak roof successfully held by roof bolts at Melville No. 11 is this belt entry (left), looking inby from the point at which bolting had started. Crossbars installed up to this point had failed to hold the roof. A fall 20 ft high at an intersection (right) shows how the top keeps coming if not adequately supported.

By Providing Clearance Necessary in Change to Mobile-Mining Units . . .

Roof Bolts Up Efficiency 50%

Switch From Timbering to Roof Bolting Permits Revised Methods, Achieves Better Control of Weak and Variable Top and Reduces Water Gage Nearly ½ In—Three Men, Working in Mining Cycle, Install Over 100 Bolts per Shift

A 50% INCREASE in tons per man employed underground is the principal reason officials of the Hutchinson Coal Co. are highly enthusiastic over the results of roof-bolting adopted in lieu of wood timbering in Melville No. 11 mine, in Logan County, near Stollings, W. Va. Better control of the extremely bad mine roof has been achieved at a cost which in the long run is expected to be less than with timbering. Improved mobility through greater clearance for men and equipment has contributed to the higher efficiency. Fewer falls and freedom from timbering have reduced ventilation water gage nearly ½ in. Both room and development bolting is done on the production cycle by three-man crews, each operating two stopers.

Melville mine, presently producing 1,800 tons per two-shift day, was opened by the Hutchinson organization in 1946 with a belt slope 1,090 ft long on a 16-deg pitch. Under the leadership of Robert A. Ritchie, Fairmount, W. Va., president, and a local management headed by O. G. Schwant, general manager, Logan, W. Va., the company operates three mines in Logan County—Melville No. 11, Hutchinson and Dabney. E. R. Cantley is superintendent of Melville No. 11 and Jess Nelson is mine foreman.

ROOF HIGHLY VARIABLE

The Eagle (No. 2 Gas) seam mined lies generally level, but with local dips. Coal thickness averages 52 in, with a range of 42 to 60 in, and cover ranges from 275 to 1,900 ft. Not only is the mine roof weak, but it also is highly variable in character. Its only consistent member is a main sandstone stratum 20 to 30 ft above the coal. Immediate top may be draw-slate, black slate or laminated sandstone, or combination thereof,

BOLTING CYCLE—12 TO 14 PLACES PER SHIFT



1 FIRST STEP in the 25-min cycle for installing eight 44-in roof bolts per place, compressor mounted on crawler truck is parked near face in position for starting work.



2 TWO STOPERS start drilling immediately as third man unloads equipment and places eight bolts in ready position. Bag collectors are on air legs, and are aspirated by jets.



3 READIED BOLT, completely assembled by third man is placed in hole by stoper operator who then . . .



4 DRIVES BOLT HOME to expand wedge, anchoring it in rock. Stoper operator then moves to next hole as . . .



5 THIRD MAN uses impact wrench to tighten nut until plate is distorted, then moves to next bolt.

and the total may range from a few inches up to 11 ft. On top of the immediate roof there is a 1½-in band of sandstone. Above that is more weak slate extending to the main sandstone.

Wood timbering, consisting of 6 x 8-in by 16-ft bars on 3-ft centers, used with the original mining equipment (power duckbills) was expensive and would not hold with spans of 10 ft or so between posts. Study of other mines several years ago indicated that better efficiency could be obtained with mobile loaders and shuttle cars, since some of the grades worked against efficient shaker conveying and the bottom was consistently firm and well suited to shuttle-car haulage. With wooden crossbars, however, holding spans wide enough for the shuttle cars was the rub that posed a real problem.



MELVILLE NO. 11 TIPPLE, handling 1,800 tpd, will clean feed down to ⅛ in with sand cone when installation of additional equipment now under way is completed.

METHODS CHANGE SUCCESSFUL

After roof-bolting had proved its practicability in many mines of the country, it was decided to try it in Melville No. 11 in combination with mobile loading and rubber-tired haulage. The change, made in June, 1949, proved successful and now all four sections of the mine are operated with loaders and shuttle cars protected by roof-bolts installed on the production cycle.

Roof-bolting equipment for each section includes one Acme 210-cfm compressor made by the Acme Machinery Co., Williamson, W. Va., mounted on a Joy T2 crawler truck, two Cleveland stopers, one Power-Vane impact wrench made by Chicago Pneumatic, two dust collectors and four Timken steels of 18, 24, 36 and 48 in. Some of the dust collectors are Browning and the others are United Engineers.

Since two men with one stoper could not drill and bolt fast enough to keep ahead of the Joy 14 BU loader, the crews were increased to three men and two stopers were supplied each crew. The three men drill and bolt 12 to 14 places per shift, with the record standing at 16 places. All headings and rooms are 18 ft wide. Cuts average 7½ ft and eight bolts, all inserted vertically, are installed per cut. Bolts are 1 x 46 in, split-and-wedge type, and those presently in stock are the rolled-thread type made by the Bethlehem Steel Co.

SPEEDY BOLTING CYCLE

When a crew moves the compressor and equipment into a place, the usual procedure is for two men to start drilling immediately, while the third man unloads other equipment and places the eight bolts in ready position, with wedges inserted part way, the plates on and the nuts screwed on far enough to leave ½ in of the bolt end exposed.

Holes are drilled 44 in deep. After the first hole is completed, in 3 to 5 min, the third man inserts a bolt and the stoper operator, after placing a driving dolly on the stoper, drives the bolt in to expand the upper end. The hammering effect is against the nut but the strain on the thread shows no harmful effect. After the driller moves his stoper to the next hole, the third man, using the Power-Vane wrench, tightens the bolt until the plate is deformed or the nut has quit turning.

BOLTING PARES COSTS

The usual time spent by a bolting crew in a working place is 25 min. When bolting was first started in the mine, there was a saving in bolting labor and material amounting to $1.80 per cut of coal, not including the lower transportation and handling costs of bolts, as compared to the installation of crossbars and posts. Now that bolts cost approximately 50% more than originally, the saving in material and labor has been wiped out and some of the saving in handling cost cancelled. However, the big advantage remains—a 50% greater production per man working underground with the new methods made possible by roof bolting.

Other equipment per section includes one Goodman 512 shortwall cutter with bugduster, one Joy T-2 crawler truck to carry the mining machine, two Joy shuttle cars and one Chicago Pneumatic 572 coal drill. The cutters are equipped with 8½-ft bars and Goodman throwaway bits. Of the eight shuttle cars in the mine, six are Type SC and two are 32E. McLaughlin bits are used on the coal drills and shooting is done with permissible powder.

Rooms are driven 18 ft wide on 40-ft centers and are 310 ft deep from the belt, which is on No. 3 heading of the 4-heading butt entry 2,000 ft long. Four rooms are driven to establish a 45-deg pillar line, and the pillars then are taken by pocketing, or open-ending if the top permits.

TRACK HAULAGE INSTALLED

Shuttle cars discharge directly to the 30-in section belt. Other conveyors with belts of the same width carry the coal to the slope bottom, from which it is lifted 340 ft to the tipple by a 36-in Goodyear Compass 100 cord belt on a Robins conveyor on 1,180-ft centers.

Track haulage now is being installed to displace the 5,000 ft of main-line belt. Section belts will load into new ACF 4-ton drop-bottom cars (100 have been purchased), which will discharge into a hopper at the slope bottom. The track is being installed with 60-lb rail on chromated-zinc ties furnished by the Appalachian Wood Preserving Co. Fewer maintenance delays affecting haulage and quicker and safer transportation of men and materials are the reasons for going to track haulage on the main line.

The tipple is equipped with a Chance cone washing 4 x ¼ in, but equipment now is being installed to extend the cone feed down to ⅛ in. After large impurities are removed on a scalping screen having 4-in holes, the oversize coal is crushed to 4 in. A 350-ton silo serves as a surge and storage bin. Most of the coal goes to the by-product market.

How to Insure Full Protection With Electrical Safety Devices

Installation of Good Equipment Is Not Enough—Operating Limitations of Safety and Grounding Devices and Importance of Human Element Must Be Understood and Anticipated—Current Leakage Major Hazard, Tests Prove

This Study Shows the Causes of Electrical Hazards and How to Avoid Them—How You Can Use a Leak Detector to Guard Men and Machines From Dangerous Currents

By F. J. BUCHER
Electrical Engineer, Hillman Coal & Coke Co., Pittsburgh

THE FACT that the conditions under which we use electricity underground accentuate the hazards resulting from insulation deterioration on equipment and power distribution circuits should be kept in mind continually by every man in the coal-mining industry. While great progress has been made in methods of transmitting and using electric power, and in the application of safety devices, such as, fuses, circuit breakers, safety grounding conductors, etc., we cannot overlook the fact that with all their good features all electrical safety devices have definite limitations.

The very presence of these devices is a reminder of the ever-existing danger. In fact, these safety devices *mean* danger, and they may, in themselves, be the unintended cause of damage or injury when users do not understand that the protection they provide is determined to a great extent by factors within the control of these users.

It is lack of understanding that will cause a man to disregard the need for assuring himself that the safety grounding conductor on his machine is securely fastened to a good "ground." The same lack of understanding is responsible for overfusing, "blocking-in," or excessively high setting of overload trip devices. Lack of understanding induces complete dependence upon available protective devices. It also induces a false sense of security which may result in serious injury.

Our electrical safety devices mean danger because they are not, and never can be, foolproof, inasmuch as their effectiveness depends to some extent upon human elements. There is always the possibility that a grounding conductor or its connections may be defective, that an overcurrent trip device will be inoperative, or that a fuse will have excessive time lag, etc., thus preventing efficient carrying out of the protective function.

These statements are not to be interpreted as a condemnation of electrical protective devices as such, but rather as a warning that no user should place his entire faith in their infallibility.

The safest thing is to proceed on the assumption that the safety device is provided to function as a last resort, when all other available methods have failed to prevent the condition that will bring the safety device into operation. This point of view should no longer be considered "visionary."

Lack of understanding of the fundamental causes of electrical hazards limits the effectiveness of the electrical safety rules formulated in state mining laws and the federal mine safety code. Lack of understanding has been a major contributing factor in electrocutions, burns, fires and explosions attributed to the use of electricity in coal mines. One cannot reconcile faulty wiring; faulty installation, maintenance and handling; or general neglect of electrical equipment with anything but lack of understanding or outright disregard of the probable results.

What the Hazards Are

The variety of methods and protective means now in use or advocated for the prevention of electrical hazards in coal mines reflects the different interpretations of the basic problem. The indiscriminate introduction of equipment and methods beyond the understanding of the ultimate users can fail to accomplish the desired results where conventional proven operating practice, based upon adequate training and visualization of the hazards involved, will do a better and more consistent job of reducing accidents and failures of an electrical origin—at less cost.

For the purpose of this discussion, electrical hazards are considered to fall within one of two general classifications:

1. Hazards resulting from accidental causes or human error.
2. Hazards resulting from normal wear and tear of equipment and circuit insulation.

Overcurrent protective devices,

Adequate Sectionalizing Is a Basic Requirement for Electrical Safety

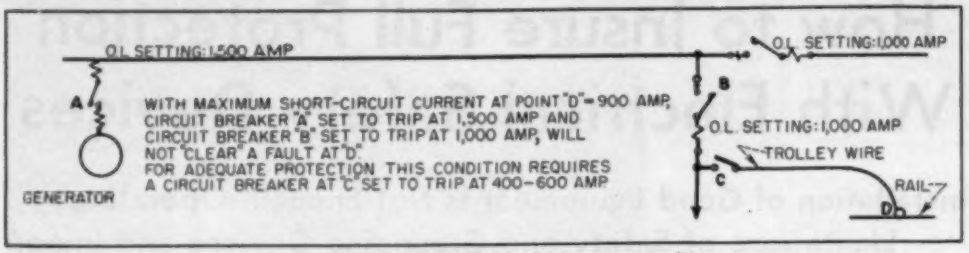


FIG. 1—ILLUSTRATING PRINCIPLE of adequate sectionalizing.

How Current Leakage Can Cause Mine Fires



FIG. 2—FIRE-HAZARD EXAMPLE—Faulty installation and lax wire maintenance results in current leakage.



FIG. 3—HOW DEFECTIVE or contaminated hangers can ignite roof coal.

such as fuses and circuit breakers, give us protection against hazards in the first classification.

Preventive maintenance of equipment and circuit insulation, backed up by overcurrent protective devices, can give us more adequate protection against hazards in the second classification. Preventive maintenance of insulation, in turn, can best succeed if it is based upon systematic testing of the insulation resistance or upon measurements of leakage currents.

FIRE HAZARDS

The most readily understood electrical fire hazard results from contact of two bare electrical conductors of opposite phase, or polarity, such as, contact of trolley wire or feeder cable with the rail as a result of falls of roof, or other accidental cause, such as contact of a loading-machine boom or cutting-machine bar with a trolley wire or feeder. The electric arc which results can easily ignite combustible materials in the immediate proximity. In most instances the arc or "fault" current will be considerably higher than the normal peak or overload currents on the circuit involved.

Therefore, fuses and circuit breakers generally provide adequate protection against such occurrences, if care is taken to see that the current required to trip the circuit breaker or cause "blowing" of the fuse is less than the probable arc or "fault" current. This limitation infers that the relation between allowed overload currents and probable "fault" currents must be considered for each individual circuit to select the overload relay setting or fuse rating that will insure the desired degree of protection (Fig. 1).

For occurrences involving equipment and trailing-cable failure, additional protection can be provided by individual circuit breakers used in conjunction with "ground-trip" devices actuated by the fault current flowing in the grounding conductor (see "Grounding Mining Equipment," Thomas R. Weichel, August, 1949, *Coal Age*).

Another type of electrical fire hazard results from the heating effect of leakage currents flowing through defective insulation. The heating effect is equal to the resistance of the leakage path, multiplied by the square of the current flowing through it (Figs. 2 and 3).

The following table shows that the energy released by a leakage

Heating Effect of Leakage Currents For 250-V Circuits

Resistance of Leakage Path, Ohms	Leakage Current, Amperes	Energy Released, Watts
10,000	0.025	6.25
5,000	0.050	12.50
2,500	0.100	25.0
1,000	0.250	62.50
500	0.500	125
250	1.0	250
100	2.5	625
50	5.0	1,250
10	25.0	6,250

current of 0.25 amp at 250 v is 62.5 w. If this amount of energy is released within a small area, such as a defective wire-hanger or a badly insulated cable splice, it can cause sufficient heating to originate a fire. It is only necessary to consider the heat released by the filament of a 60-w lamp to realize that 62.5 w of energy (0.25 amp at 250 v) can cause considerable damage.

The greatest danger resulting from leakage currents is that we are unaware of their existence until visible evidence develops, at which time considerable damage may have been done already. The only effective method for detecting these leakage currents is to measure their intensities periodically.

A third type of electrical fire

This Mining Machine Is Electrically Safe . . .

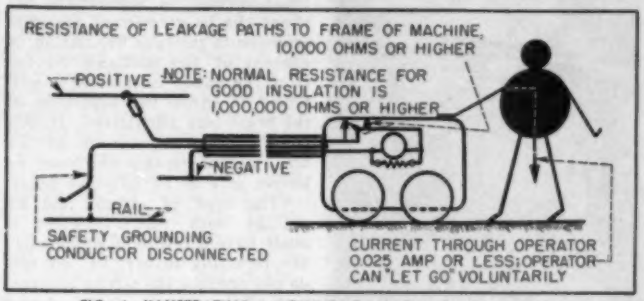


FIG. 4—ILLUSTRATING MACHINE electrically safe for operator.

But Here an Injury or Fatality Is Possible

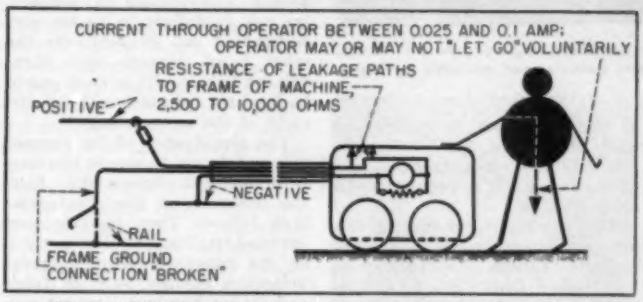


FIG. 5—INDICATING CONDITIONS that may result in electrical injury.

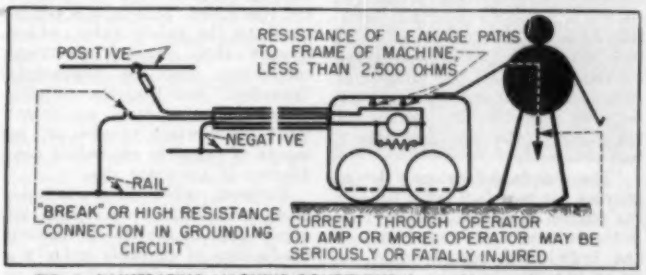


FIG. 6—ILLUSTRATING MACHINE CONDITIONS that could cause fatal injury.

hazard results from the overheating of conductors. When electricity flows through a conductor, there occurs in the conductor a loss of energy, which is dissipated in the form of heat. The amount of heat energy released is equal to the resistance of the conductor multiplied by the square of the current flowing through the conductor. For example:

The resistance of the current path through 350 ft of a trailing cable having two No. 4 copper power conductors is 0.175 ohm. A current of 200 amp flowing through such a cable will cause a heating effect of 7,000 w (0.175-x200x200). This is the equivalent of 14 500-w strip heaters. It explains why some trailing cables fail prematurely, or why sufficient heat may be generated to cause a fire when excessive current flows through a conductor. It also explains why sufficient heat may be released at a defective splice or electrical connection to cause considerable damage or start a fire.

EXPLOSION HAZARDS

All the conditions referred to previously as capable of igniting combustible materials also can ignite explosive mixtures of methane or dusts. In addition, such explosive mixtures may be ignited by stray currents, i. e., by currents of electricity flowing through other than the regular conductors.

This results from the fact that electricity follows all available paths in direct proportion to their respective resistances. In a "grounded-return" power-distribution system this means that inadequate-sized conductors, defective and broken rail bonds, or other bad conductor connections, which increase the resistance of normal return-current paths, cause "stray" currents to flow from rails or other power conductors to ground or to some adjacent metallic paths.

These stray currents, together with the leakage currents referred to under "Fire Hazards," may well create voltage gradients in the ground strata. The voltage difference between points along the faces of a coal mine, or between the same points and the normal power-return circuit, can reach values sufficient to detonate explosives. The voltage difference also may be sufficient to produce the arc which could ignite an explosive mixture of dust or methane when a machine equipped with a grounding conductor comes in contact with, say, a water line, or possibly, the coal face itself.

The best known means of preventing the hazards resulting from stray and leakage currents are:

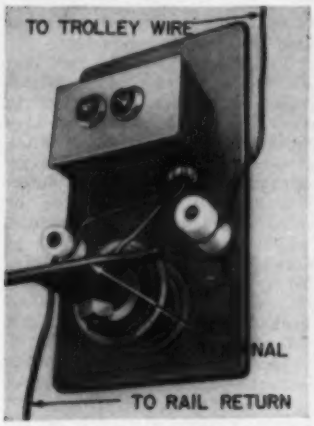
Adequate conductor sizes.
Good electrical connections.
Adequate conductor insulation.
Good bonding of track circuits.
Keeping leads of shotfiring cables and detonators "shorted" until ready to fire shots.

SHOCK HAZARDS

A man is subjected to shock when a current of electricity flows through his body. The extent of shock or injury depends upon the amount of current flowing and the path of this current through the body. The amount of current, in turn, is determined by the voltage of the source and the resistance of the current path. The resistance of the current path through a human being depends upon the following factors:

Condition and thickness of the skin.
Amount of moisture on the skin.
Extent of contact area.
Voltage of power source.

Thick rough skin offers greater resistance to the flow of current than thin smooth skin. Also, it is understandable that a large skin area in contact with a source of electricity offers less resistance to





FIGS. 7 AND 8—LEAK DETECTOR (top) on steel plate for hanging on post or wall; right-hand lens in red; left-hand, green. At testing station on post near cable nip (right).

the flow of current than a small area. Body tissues themselves offer little resistance to the flow of current because the blood stream is a relatively good conductor of electricity.

The resistance of the skin can be broken down by cuts or abrasions, and it is reduced very considerably by pores filled with perspiration. A fact less readily understandable is that the effective resistance of the skin is less at high voltages than at lower voltages. For instance, a skin area with a resistance of 10,000 ohms at 50 v has a resistance of only 1,500 ohms at 250 v and 1,200 ohms at 500 v.

The resistance of dry skin may be as high as 16,000 ohms per square inch, but the resistance of the same skin when it is wet may be as low as 160 ohms per square inch of contact surface.

When a machine operator is exposed to shock hazards under average mine conditions, the odds are that his hands and feet will be sweaty, his gloves and footwear will not be effective insulators, and the current path will be from one hand to both feet. This being the case, we can assume that a machine operator may represent a current path having a resistance of only 150 ohms. This means that on a 250-v power system the current flowing through the operator of an "ungrounded" machine having defective insulation would be approximately:

1. 0.025 amp when the insulation resistance of the machine is reduced to 10,000 ohms (Fig. 4).

2. 0.1 amp when the resistance of the insulation is reduced to 2,500 ohms (Fig. 5).

3. 1.25 amp when the resistance of the insulation is reduced to 50 ohms (Fig. 6).

The resistance and current values noted are based upon data given in "Effects of Electricity on the Human Body," W. B. Kouenhoven, Fellow AIEE, March, 1949, *Electrical Engineering*. While the following quotes cover the essential data we are concerned with, it is suggested that readers refer to said paper and the additional reference matter noted therein for detailed information concerning the value of the data and how it was obtained:

"The standard-frequency let-go current for men is 9 milliamp and for women it is 6 milliamp. This is the current value that 99.5% of the individuals tested could release voluntarily. The value of the let-go current varies with the individual, and it was found that for men it ranged from 8 to 22 milliamp. The current that will hold an individual frozen to a circuit is naturally in excess of his let-go value. Because of the heating produced by the current where it passes through the epidermis and the short time required for the skin to blister and lose its protective resistance, this freezing current should be avoided at all costs. Unless there is someone present to break the circuit the result may be fatal.

"There is no information available as to the current an individual can tolerate without losing consciousness. The lowest value of current that will produce unconsciousness is somewhere between the let-go current and that required to produce fibrillation. A current of 100 milliamp flowing from the hands to the feet is sufficient to throw the ventricles of the heart into fibrillation. In this condition the circulation of the blood ceases because the heart no longer acts as an effective pump.

"The type of circuit and its voltage with which contact is made have a profound effect upon the resulting injury. DC circuits do not produce the strong contraction of the muscles that is found with AC and, in general, the sensation produced by DC is greatest when the circuit either is made or broken. Low-voltage DC circuits are not as dangerous as the corresponding AC circuits. On the other hand, contact with high-voltage DC circuits is more apt to be fatal than contact with AC circuits of the same voltage."

The significance of the current values referred to should be clearly understood because they form the basis of all the conclusions that follow. They indicate that "ground-trip" and similar devices, or the conventional overcurrent protective devices, such as, fuses and circuit breakers, give no protection as far as shock hazards are concerned. This fact is recognized by the safety rules, which require that exposed electrical conductors must be adequately "guarded," and that the metallic enclosures of electrical equipment must be securely "grounded" by means of separate grounding conductors of adequate size.

However, when we are considering accidental occurrences, we cannot assume that the grounding conductors of movable mining equipment will not be broken or disconnected from a frame or from "ground" at some time or other. Neither can we assume that when this happens there will be no current flowing in the grounding conductor, and that no one will be leaning on, or touching, the machine involved.

Operators of electrical equipment should understand that a machine is free from shock hazards only as long as the grounding circuit is good and of low resistance. This implies that the grounding conductor of the machine involved must be in good order, and also that the grounding path to which this conductor is connected must be good also.

A machine operator who does not know when or how much cur-

rent flows through the grounding conductor of his machine is not in position to protect himself. He can be subjected to fatal shock if, for any reason, the grounding path of his machine is broken while as much as 0.2 amp of current flows through the grounding conductor.

Only electrical measurements can show a machine operator when leakage reaches values that actually expose him to injury. Therefore, measurements taken at suitable intervals can place him in position to effectively protect himself.

What Mine Tests Show

To evaluate the practicability of systematic testing in coal mines a survey was made of leakage currents on typical mining equipment and branch power-distribution circuits in 11 mines. Circuits and machines were selected at random and measurements of the leakage currents were taken after preliminary visual inspections of the machines or circuits involved.

This procedure revealed that the physical appearance of insulation is not a dependable indication of its electrical value. Many conditions considered unsafe by visual inspection were subsequently found to be safe by test. Others considered safe by visual inspection were later found unsafe by test. It also was revealed that a casual inspection overlooks many causes of hazards.

In every instance where measurements indicated leakage in excess of the 0.025-amp let-go current value, the cause of the leakage had been noticed during the preliminary inspection preceding the leakage measurement, or was located during more careful visual inspection after the measurement disclosed the existence of the excessive leakage. All defects thus found would have resulted in early total failures, and all were easily and quickly repaired after detection.

These facts indicate that a practical method of testing can contribute greatly to the prevention of shock hazards, and it can be justified from an economic standpoint through the prevention of many electrical failures.

All measurements were analyzed and divided into three groups:

1. Measurements indicating leakage of less than the let-go current value of 0.025 amp.

2. Measurements indicating leakage equal to or higher than the let-go current value, but lower than 0.1 amp.

3. Measurements indicating leakage of 0.1 amp or higher.

Machines or circuits in Group 3 were taken out of service until adequate repairs could be made.

The results of 320 of the most significant measurements are shown in the following table:

Group 1	Group 2	Group 3
Leakage Current, Amp:		
Under 0.025	0.025-0.1	0.1 or more
Number Measurements:		
234	77	9
Percent Measurements:		
73.12	24.06	2.81
Insulation Resistance, Ohms:		
Over 10,000	2,500-10,000	2,500 or less

This grouping of measurements assumes that from a practical mine-operating standpoint:

Leakage of less than 0.025 amp is safe (Group 1).

Leakage between 0.025 and 0.1 amp (Group 2) is potentially dangerous. The cause should be located and corrected immediately.

When the leakage is 0.1 amp or more (Group 3), the equipment or circuit should not be used until the cause of leakage is located and corrected.

This interpretation does not follow standard electrical practice, which recommends that 1,000 ohms per volt should be considered the minimum safe insulation resistance. However, it considers the fact that, of the 320 measure-



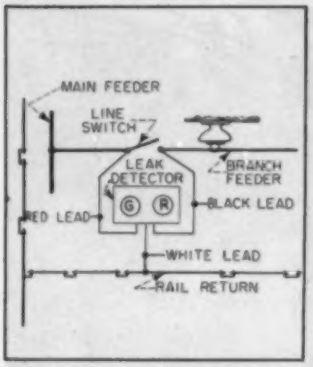
FIG. 9—TESTING STATION conveniently located for gathering-locomotive operator, who is testing negative side of reel circuit.





FIGS. 10 AND 11—OPERATOR READY (left) to test loading-machine cable—positive nip in right hand, negative in left, safety grounding conductor left on rail. At right, testing negative side of circuit for leakage to frame and ground.

Stationary and Portable Detectors Prove Value in Various Locations





FIGS. 12 AND 13—LEAK DETECTOR on branch feeder (left); and on workbench (right), with electrician testing controller-drum segment for leakage to shaft.



FIG. 14—LEAK DETECTOR on portable stand, with operator testing motor winding for leakage to frame.



FIG. 15—ELECTRICIAN TESTING circuits at controller; negative side of locomotive circuit removed from frame for these tests.

ments in the preceding table, only 82 (25.62%) indicated insulation that would meet standard electrical requirements. A program of preventive electrical maintenance that would condemn 75% of our mining equipment and power distribution circuits obviously is not practical at this time.

On the other hand, the problem is entirely different if we contemplate a testing procedure designed to locate only the potentially dangerous defects in Groups 2 and 3. The practicability of a preventive maintenance program designed to avoid only the unquestionable hazards which develop when insulation resistance falls below 10,000 ohms becomes more evident when we consider that typical resistance values of new insulation (for service up to 600 v) are approximately as follows:

	Megohms*
DC motor	5-20
DC controller	5-20
Feeder or trolley-wire hanger	100-200
350 ft 2/c or 3/c No. 4 trailing cable	10,000
350 ft 2/c or 3/c No. 2 trailing cable	8,000

* 1 megohm is 1,000 ohms.

The layman need only consider that regardless of whether we refer to electrical resistance as megohms, ohms or any other term, the electrical difference between a new motor and a motor in Group 3 is comparable to the difference between 5,000,000 and 2,500, and that the electrical difference between a new trailing cable and a cable in Group 3 is comparable to the difference between 10,000,000,000 and 2,500.

None of the instances of excessive leakage found during the survey resulted from general deterioration of the insulation in the machines or the circuits involved. In all, the leakage was concentrated at such points as badly insulated cable splices, damaged cable insulation in bushings or stuffing boxes, and defective or contaminated insulation on finger boards, contactor supports, brushholder studs, etc., on resistors, motors or control equipment.

Some feeders and trolley wires were found to be in contact with roof, ribs or wet timbers, or to have faulty or excessively contaminated hangers. Every leakage measurement in Groups 2 and 3 disclosed a definite hazard and a source of certain eventual failure, or a circuit and machine that was well on the way to becoming a definite hazard and source of certain failure.

Application of Leak Detectors

Inasmuch as a great proportion of the electrical hazards and electrical failures in typical mines were found to result from defects such as noted in the preceding paragraphs, a long-known fact became more apparent, namely, that these hazards and failures can best be prevented by the men in daily contact with the power-distribution circuits and electrical equipment. This means that mine supervisors and operators of equipment should be in position to detect and recognize the causes of these hazards and failures.

It became apparent also that any program attempting to keep circuits and equipment in service until conditions develop which are known to be definitely hazardous, and still having a good chance of preventing injuries and failures, would involve frequent testing under a procedure that would be dependable, simple and economical. Therefore, a "Leak Detector" was conceived that embodies these fundamental requirements and enables anyone to determine when the insulation of a power-distribution circuit or machine is above or below a predetermined minimum safe value.

This leak detector (Fig. 7) consists of two 6-w 120-v lamps in suitable sockets mounted in a steel box approximately 5 in long, 3½ in wide and 3 in deep. A red lens is provided on the face of the box over one of the lamps and a green lens over the other. The lenses are 1 in in diameter and are mounted

on 1½-in centers for easy, simultaneous observation of both. Suitable resistors are connected in series with the lamps for use on voltages higher than 120.

Standard leak detectors are made to indicate when leakage in a circuit or machine is less than, equal to, or more than the let-go current value of 0.025 amp. The detectors can be changed for leakage allowances other than 0.025 amp.

When a user checks a machine or electrical circuit with this leak detector, he observes the two indicating lights while making the test. The lights normally are equally bright, but when an external resistance is connected to the detector the relative brilliancy of the two indicating lights changes for values of external resistance above or below the value that represents the amount of allowable leakage for which the detector is built.

When the external resistance (insulation) is such that it represents leakage of less than the let-go current of 0.025 amp, the green light of the detector will show up brighter than the red during the test.

When the external resistance is such that it represents a leakage of approximately 0.025 amp, the two indicating lights will remain equally bright during the test.

When the external resistance is such that it represents leakage greater than 0.025 amp, the red light will show brighter than the green.

When the external resistance is such that it represents leakage of approximately 0.1 amp (the dividing line between Groups 2 and 3), the red light will show bright and the green will be barely visible.

When the green light becomes invisible during the test, it indicates leakage in excess of 0.1 amp (Group 3).

The leak detector is not designed to give accurate resistance readings. However, it does unmistakably classify a machine or circuit in Groups 1, 2 or 3. After a few tests, the user can evaluate the approximate position of an indication in Group 2.

The success or failure of a program involving daily tests of equipment and power-distribution circuits depends almost entirely upon the availability of the testing device and the simplicity of the test procedure. Existing applications are based on the assumption that men will cooperate if they are not required to go out of their way to do so. The following describes some typical applications:

MACHINE-LOADING SECTIONS

A leak detector is mounted on a steel plate approximately 6 in wide by 8 in long, together with a standard trolley-wire hanger. A 4- to 6-in length of bare trolley wire is fastened to the hanger. This assembly constitutes a testing station on which the leak detector is wired in such a way that the piece of bare trolley wire becomes the "test terminal" (Fig. 7).

The testing station is thus convenient for mounting on a post or other suitable support near the point where machine nips are regularly connected to the power supply (Fig. 8).

In sections where machine operators move their cable nips during a working shift, the testing station is located at a point all operators pass at least once during the working shift, or, if necessary, two or more testing stations may be provided in a section (Fig. 9).

When locating testing stations, one should keep in mind that operators are more likely to test their equipment if they can do so without deviating from their usual routine. When a machine operator approaches a testing station, he sees the two indicating lights of the leak detector, which glow at approximate equal brilliancy. This reminds him of the purpose of the device and also shows him that the detector is in operating condition.

To test his machine, the operator takes the positive nip of the trailing cable in one hand, the negative nip in the other (Fig. 10). After assuring himself that the frame of the machine is connected to "ground," he first touches the test terminal of the testing station with the positive nip and observes the indicating lights as he does so. Then he removes the positive nip and touches the test terminal with the negative nip, again observing the indicating lights (Fig. 11).

These two simple moves will show the operator whether either side (positive or negative) of the cable and machine circuit has developed injurious leakage to ground. Operators are instructed to notify their foreman when either one of these two tests causes the red light to become noticeably brighter than the green light. Mine officials, facebosses, and repairmen make occasional spot checks.

On applications where machine cables are "plugged" into power centers, suitable receptacles can be provided at the testing station to receive the cable connectors of individual machines for testing purposes.

HAND-LOADING SECTIONS

A testing station is provided along the normal path of travel of each cutting-machine crew. The cutter tests his cable and machine as described previously.

BRANCH WIRING

A leak detector is mounted so that it can be seen readily by anyone who has occasion to close or open the branch circuit switch. It is then connected as shown in Fig. 12.

In this application, when the line switch is open, the branch feeder corresponds to the test terminal of the testing station shown in Fig. 7. Therefore:

1. When the line switch is open, the red indicating light will be brighter than the green light if injurious leakage exists from the branch feeder wire to ground.

2. When the line switch is closed, the green indicating light will be bright and the red light will be "out," indicating that the branch wire is "hot."

With a leak detector at the branch-wire switch of Fig. 2, the pumper would have "seen" that the pump feeder wire was "grounded" before he closed the switch the first time after the branch wire came in contact with the roof. A fire hazard and a considerable power loss might have been prevented.

REPAIR SHOPS

The leak detector can be used in two ways in repair shops:

1. As a stationary tester on workbenches or mounted on a wall with test leads of sufficient length to reach the work (Fig. 13).

2. As a portable tester mounted on a suitable stand with power-supply leads extended to reach the work and test leads of convenient length (Figs. 14 and 15).

In these applications the leak detector is safer and more dependable and convenient for the workman than a conventional test light or magneto ringer. It is particularly handy for locating "open circuits" or other difficulties in magnetic control devices.





1 VALLEY VIEW CLEANING PLANT (left) features heavy-media separation in a drum-type vessel for recovering salable coal from high-refuse feed. Feed hopper (right) receives coal from bank chute, as shown, or from trucks or railroad cars.

New Heavy-Media Plant Features Drum-Type Separating Vessel for . . .

Profitable Bank Reclamation

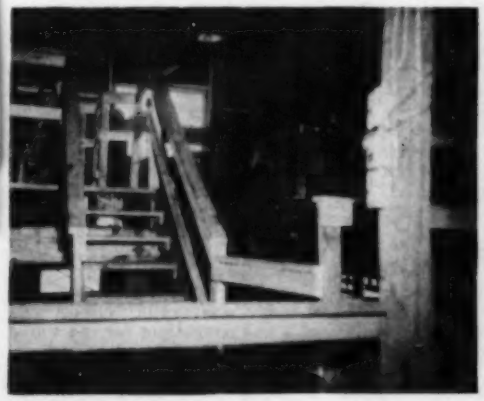
Mounting Production From So-Called "Refuse" Banks Reflects the Development of Improved Cleaners

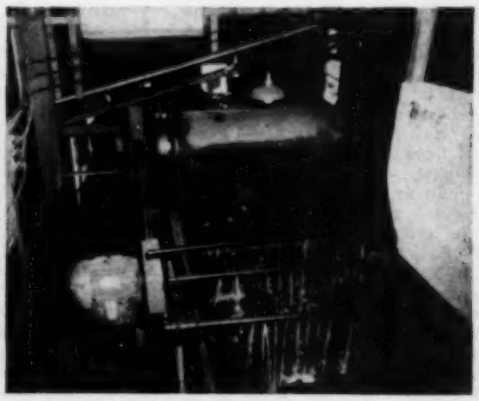
Valley View Coal Co. Uses Coal Pumps for More Efficient Handling of Fines and Clean Coal

VALLEY VIEW COAL CO., Scranton, Pa., exclusively engaged in reclaiming anthracite from refuse banks, suffered a severe setback July 15, 1950, when the preparation plant near Inkerman, Pa., burned to the ground. In effect, the company was out of business until a new plant could be erected.

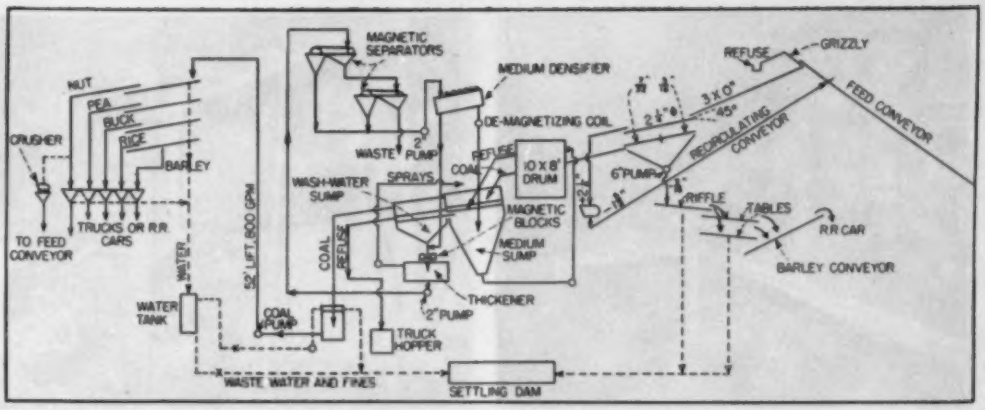
Starting from scratch as soon as the embers cooled, Valley View officials—R. E. Nolan, president, and John A. Hart Sr., vice president and general manager — started the rehabilitation process. The site was cleaned up and usable equipment was salvaged while the search for a new plant was pushed.

Nine months later—April 19, 1951, to be exact—the company was doing business at the same stand—this time with a Wemco 5C Mobil-Mill. Mr. Hart says the plant would have returned to operation sooner if inclement winter weather had not slowed building.





2 FEED CONVEYOR moves bank material over grizzly to scalp and discard plus 3-in rock and pit-prop refuse. Double-deck vibrator (right) sizes minus 3-in feed into three splits for crushing and recirculation, heavy-media cleaning and tabling.



EFFICIENT CLEANERS, maximum realization of the advantages of coal pumping and adequate provisions for recirculation of the larger sizes permit Valley View to economically recover standard anthracite from stubborn feed.

The new Mobil-Mill, manufactured by the Western Machinery Co., is a package unit installed between Valley View's own feeding equipment and sizing-and-loading equipment, some of which was salvaged from the older plant. The installation features a 10x8-ft drum-type separating vessel, one of the first vessels of this type in the anthracite region. Rated at from 150 to 175 tph, the Mobil-Mill uses magnetite to make a separation at 1.70 sp gr.

Briefly, the Valley View process consists of (1) rejecting at the feed conveyor all plus 3-in material, which is almost 100% refuse and contains prop tops, old cappieces and other foreign matter, (2) cleaning 2¼x⅜-in in the Mobil-Mill and (3) cleaning Barley No. 3 on two Deister Super-Duty Diagonal-Deck tables. The table product is loaded directly to railroad cars, the product of the heavy-media separation is sized and stored in bins for rail or truck transportation and the plus 3-in initial reject is stored in a hopper along with refuse from the Mobil-Mill. Table refuse is sluiced to a settling dam.

THREE AUXILIARY FEATURES

While the new plant was being erected, Mr. Hart was busy designing the feed- and product-handling equipment that would be required to serve the installation. As a result of Mr. Hart's efforts the plant now features:

1. A 6-in coal pump that transfers minus ⅜-in fines from a feed-sizing Robins Elliptex double-deck vibrator to the fine-coal tables through a 6-in Johnsonite plastic pipeline.

2. A similar pump that raises a clean-coal-and-water slurry 52 ft from a collecting tank to the sizing shakers. The tank receives clean coal from a single-deck Elliptex vibrator in the Mobil-Mill.

3. A water circuit that permits reclamation of the water pumped to the sizing shakers with the clean coal. The reclaimed water is dropped to a tank which supplies make-up water for the clean coal collecting tank.

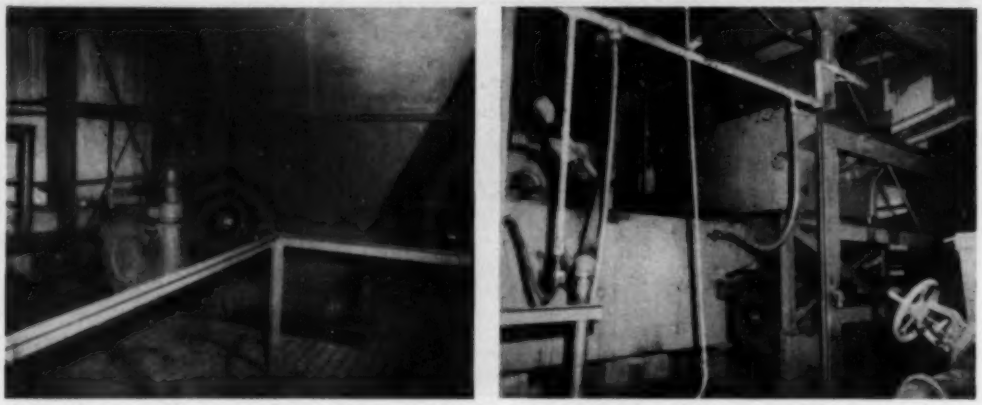
HOW THE PLANT WORKS

After a few days for running-in the plant and familiarizing the men with its operation, the installation began working at rated capacity, two shifts per day. Records for the month of May (22 working

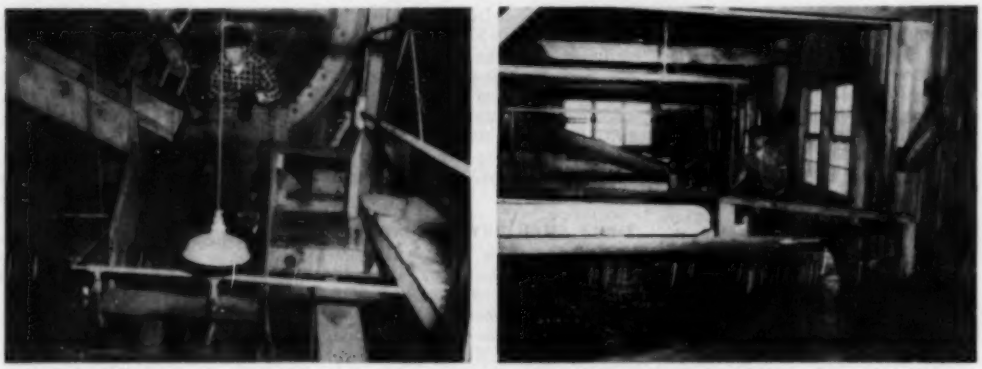




3 **OPERATING DECK** in heavy-media plant provides access to 10x8-ft drum in right background, two vibrators for medium recovery and medium densifier. Coal-to-refuse ratio of feed is indicated at right where most of screen area carries refuse.



4 FAST-DRAINING MEDIUM is returned from sump in left photo to drum. Medium in wash-water is recovered in two magnetic separators (right), one recovering magnetite from tailings of the other. Separators are fed from a wash-water thickener.



5 OVERSIZE AND UNDERSIZE—The 3x2¼ split from double-deck vibrator is relieved of tramp iron, broken to minus 1⅝ and returned to feed conveyor. Underflow of the vibrator, minus 3/16, is pumped through plastic pipe to two fine-coal tables.

days) show that 62,427 tons of feed entered the plant. About 12% is recoverable coal in size fractions as follows: Nut, 21%; pea, 21%; buckwheat, 23%; rice, 24%; and barley, 11%. Ash in the pea-to-barley sizes ranges from 9 to 11%, thus meeting standard-anthracite requirements.

As shown in the flowsheet, the top 3 ft of the feed-conveyor chute is a grizzly with bars 3 in apart. Oversize in the feed is discharged at the top of the grizzly to a refuse chute. The 3x0 is fed to the double-deck vibrator, set at 45 deg, which splits the material into plus-2¼, 2¼x⅜s and minus-⅜s fractions. The overproduct is crushed to minus 1⅝ in after passing under a tramp-iron magnet, and the crusher product is recirculated to the feed conveyor. The underproduct of the vibrator is pumped to a 3x21-ft riffle which removes minus $^{3}/_{32}$-in fines. The overproduct of the riffle is cleaned on the tables and the underproduct is sluiced to the settling dam.

The 2¼x⅜s from the vibrator is chuted into the separating drum which is filled with a magnetite-and-water charge. Rotating at 1.9 rpm, the vessel floats coal toward the discharge end and raises sink material to the refuse chute.

HANDLING COAL AND REFUSE

Both coal and refuse are fed to separate compartments of a horizontal single-deck Elliptex vibrator, where water and magnetite drain into the medium sump, as shown. A similar vibrator follows to permit coal and refuse to be washed free of magnetite, which collects in the wash-water sump.

Refuse from the vibrator is raised on an elevating conveyor to a truck hopper and clean coal drops through an 8-in pipe into the collecting tank designed by Mr. Hart. As the coal drops through the water toward the coal-pump intake, wood chips float to the surface of the water in the tank where they are skimmed off from time to time. The 6-in Morris pump then raises the clean-coal-and-water slurry to the sizing shakers in the adjoining sizing and loading plant.

The 4-deck sizing shaker is set up as follows: The top deck, 24 ft long and 5 ft wide, is jacketed with six 6x3-ft sections of perforated plate with $^{13}/_{16}$-in round holes, one section with 1⅝-in holes and one with 1⅞-in holes. The second deck has four sections with $^{5}/_{16}$-in holes and two with $^{9}/_{16}$-in holes. The next lower deck, which is 6 ft wide, has four sections with $^{5}/_{16}$-in holes; and the lowest deck, also 6 ft wide, has



6 EFFICIENT COAL PUMP (left) lifts clean coal 52 ft to sizing shakers (right) in the adjoining sizing-and-loading plant. Side-discharge chutes from shakers place coal in six 60-ton pockets. Shaker drive also operates oversize breaker rolls.



7 WATER RECLAMATION—Most of the slurry water is removed at the feed end of the shakers and dropped into a reclamation tank outside the plant. Water that enters the pockets is drained into a flume, as shown at right, and run off into the tank.

four sections with ⅝-in holes. The combination of hole sizes and screen pitch results in standard-anthracite sizing.

The shakers are driven by a 30-hp motor which also drives a set of breaker rolls that reduces the oversize to minus 1⅝ in for recirculation.

A side-discharge chute from each deck of the shaking screens carries the sized product to final storage in six 60-ton pockets from which trucks or railroad cars are loaded. The pocket structure is constructed of steel and concrete on the foundations of the preparation plant that was destroyed.

Most of the slurry water which carries the coal from the pump to the shakers is removed near the feed end of the shakers and returned directly to the water-reclaiming tank, but the water that enters the pockets with sized coal is drained into a flume under the pockets, and the flume discharges to the same tank. Drainage from the pockets and natural drainage from the loaded cars removes enough moisture to satisfy the specifications of Valley View customers.

RECLAIMING HEAVY MEDIUM

Magnetite is reclaimed in conventional Mobil-Mill equipment, consisting of a medium sump and an 8-in pump to receive the major portion of medium drainage and return it directly to the drum, and a secondary wash-water-reclamation circuit consisting of a 14-ft Wemco thickener, two Dings magnetic separators in series (36-in primary and 24-in secondary) and a 36-in Wemco densifier. Three 2-in pumps move the underflow of the thickener to the primary magnetic separator, the thickener overflow to the wash-water sprays and the magnetic-separator product to the densifier. Magnetic blocks promote flocculation of the fine medium for faster settling in the thickener and demagnetizing coils condition the densified medium for better floc breakage in the medium sump.

The system is charged with 25 tons of magnetite with size specifications of from 55 to 70% minus 325 mesh and a maximum of 5% plus 100 mesh. Medium consumption for the month of May was about 1 lb per ton of feed to the drum, with make-up magnetite added to the medium sump.

The company working force, including shift foremen J. P. Hannon and C. R. Kranick, numbers 35 men. About 10 men per shift operate the heavy-media plant and its auxiliaries, the fine-coal plant and the sizing-and-loading plant.



RUBBER-TIRED LOADERS head the list of production equipment at Lida B, and are supplemented by shuttle cars, rubber-tired and shortwall cutters, double drilling units, drop-bottom mine cars, a slope belt, roof-bolting and plastic pipe.

How High Efficiency Is Attained in . . .

Trackless Mining at Lida B

Outputs of 40 to 50 Tons per Faceman Reflect . . .

Slope Belt • Drop-Bottom Cars • Rubber-Tired Loaders

Roof-Bolting • Automatic Pumps • Plastic Pipe

RUBBER-TIRED LOADERS, big drop-bottom mine cars, a belt slope, roof-bolting and the use of automatic pumps and plastic pipe are among the major factors contributing to unusually high effi-





CUTTING OR CUTTING AND SHEARING is done by shortwall or rubber-tired universal machines using tungsten-carbide bits. Room width varies with roof conditions.



SLOPE was lined with concrete 325 ft down through the soft surface material. The rayon belt is paralleled by a supply track.



DROP-BOTTOM CARS dump into an 80-ton hopper on the bottom. Car capacity is 7½ tons, or the same as the standard shuttle car.

ciency at the new Lida B slope mine of the Franklin County Coal Corp., Royalton, Ill. With bolting to clear the way for uninterrupted loading in bad-top sections, and automatic pumps with plastic pipe to handle a rather severe water problem, productivity runs from 40 to 50 tons per man on the face crews with an average working height of 6 ft.

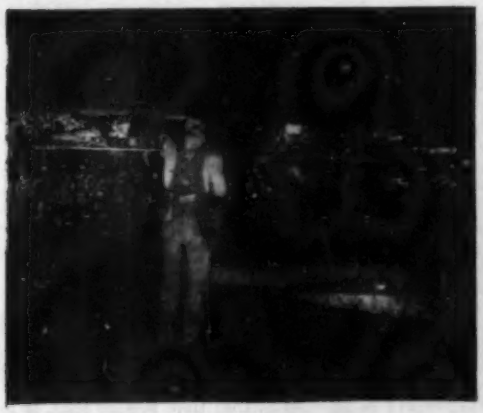
Development of Lida B mine, immediately south of the company's Royalton 7 and 11 mines, got under way in 1949. The new operation was named for the wife of the late H. H. Taylor Sr., and mother of H. H. Taylor Jr., now heading the Franklin County organization. A. L. Roberts is general superintendent of all the company operations.

Production comes from the Illinois No. 6 seam, and the coal is mechanically prepared, including oil-treating, in the central plant at No. 7 mine. It moves to market under the "Energy" trade name that distinguishes all the company's output.

TWO TYPES OF TOP

The No. 6 seam at Lida B lies fairly level under an average of 155 ft of cover. Total height is 7 to 7½ ft. However, as noted, only 6 ft is mined on the average, with the remainder left up to help support the top. The latter is of two types. On one side of the mine it is a firm black slate which makes an excellent roof. On the other side it is a white slate, which is rotten in character and falls easily. By bolting with West Virginia Steel & Mfg. and Bethlehem bolts with Ohio Brass expansion shells, using wood caps, this top is being held with a high degree of success. Without bolting, in the opinion of the management, it would have been difficult, if not impossible, to mine under this top.

The bottom is a fireclay, which softens and runs when wet. Quite a few rolls and slips, and some faults, are encountered. The water



SELF-PROPELLED DRILLING UNIT, company built, employs two drills simultaneously. Cutting heads have tungsten-carbide bits.



NEW-TYPE four-wheel drive and steer shuttle car receiving a 7½-ton load. These new cars are standard at Lida B.

comes from the overlying strata and is encountered over a large part of the mine, thus requiring concentrated attention to prevent burdening the production units. The solution consists of using Gorman-Rupp 73-lb automatically controlled centrifugal pumps, which are easily moved and installed where needed to handle inflows.

All the water is directed to the slope bottom through Johnsonite No. 1 plastic pipe, which also is easily moved and installed. At the bottom, a main pump, also automatically controlled, lifts the water to the surface through steel lines up the slope and air shaft. The use of automatic equipment permits operation without pumpers.

RAYON BELT HOISTS COAL

Coal is raised to a railroad-car loading tipple, also equipped to make railroad fuel if desired, by a 36-in Raybestos-Manhattan rayon belt operating at 440 fpm. At this speed the belt can readily handle considerably more than the 2,000 tons per shift for which the mine was set up. Total length of the belt, on a Robins conveyor, is 800 ft center-to-center of pulleys. The inclination is 15 deg. The belt is driven through a fluid coupling by a 150-hp G. E. motor.

Length of the slope to the top of the coal is 680 ft. The size is 7x16 ft and sinking in the rock was done with a 7 BU loading machine. Soft material at the surface was excavated and the slope was lined with concrete down through the surface layer and the underlying soft shale—a distance of approximately 325 ft. The remainder of the slope, except for 150 ft through sandstone, was timbered with steel. The width of the slope was adjusted to provide for a supply track in the side opposite the belt. A heavy inflow of water made sinking difficult.

Interlocking steel piling was used in putting the accompanying air shaft down to the shale. The piling, in 50-ft lengths, was driven to practically its full length to the underlying shale, and the soft material was removed with a clamshell, thus saving considerable time and expense in going through the runny water-bearing surface material. Below the piling the shaft was concreted to the sandstone, and was grouted on the outside to cut the flow of water. A 6-ft Joy Axivane fan over the shaft supplies ventilating air.

DROP-BOTTOM CARS HAUL COAL

The ultimate main-line haul at Lida B is expected to reach 2½ mi. Sanford-Day "1-2-3 Automatic" drop-bottom cars and track were selected for the main-haulage job. Capacity of the cars is 7½ tons, or the same as the standard shuttle car employed in the sections. Fifty cars are now on hand and the number ultimately will be increased to 80 to 100.

The cars are handled in trips of 9 each by 13-ton rebuilt locomotives. These locomotives pull over an 80-ton hopper—part natural rock and part steel and concrete—for dumping. A plate feeder moves the coal out onto the belt for hoisting. The main-line track is laid with 80-lb steel, with No. 9-section wire for the trolley. Panel tracks are 40-lb steel on West Virginia steel and wood ties. The slope bottom and much of the initial main-entry development was done by a Joy continuous miner.

RUBBER-TIRED LOADERS USED

Lida B mine is set up for an average production, from four trackless-mining units, of 2,000 tons per shift, two shifts per day. The backbone of each unit is a Clarkson Redbird 28-FA rubber-tired loading machine.

Coal is moved from the loaders to the car-loading stations by two Joy cable-reel shuttle cars per machine—one a 10 SC with a capacity of approximately 7½ tons, and the other a 42-E with a capacity of approximately 6 tons. The standard unit is the 10 SC, and these are employed full time because of their extra capacity and four-wheel drive and steer. The 42 E's are extra cars for use part of the time as necessary to keep unit production up to the desired figure. Both cars dump directly over the side into the mine cars, which are moved past the loading point by a Greensburg battery locomotive. The shuttle cars are right and left operation to eliminate cable interference. At the dumping point pushbuttons and lights are provided to enable the shuttle-car operators to signal the locomotive for car-spotting.

The maximum shuttle-car haul, under normal conditions, is 520 ft, and the average is 300 ft.

Headings at Lida B are driven 15 ft wide. Rooms centers are 40 ft, and the standard width is 22 to 24 ft under average conditions. Under the black slate and with better than average conditions, the places may be widened to 26 ft. Conversely, under the white slate, and especially if it is unusually bad, the width may be reduced to 18 ft. Crosscuts approximately 20 ft wide are made on approximately 60-ft centers, and it is the plan to split the pillars either crosswise or lengthwise with places approximately 20 ft wide to increase recovery.

In preparation for breaking, the coal is undercut and sheared by a Joy 10 RU universal machine, or undercut by Goodman 512's with bugdusters. Carboloy CC-2 tungsten-carbide bits are used.

Drilling is done by Franklin County designed double-unit machines, also using Carboloy bits. The drills consist of self-propelled carriages mounting posts for two Dooley 474 drills on the front corners, thus permitting two holes to be drilled simultaneously. In undercut and sheared places the coal is broken with four holes in narrow places and six in wide places. Shortwall-cut places are broken with eight holes in wide work and six in narrow. One row of holes is drilled straight in at the top and the second row about half way down the seam. In contrast with most of the Illinois No. 6 seam, the characteristic "blue band" near the bottom is absent, and thus there are no regular impurity layers, with the occasional exception of some thin bands near the floor.

TEN-MAN CREWS EMPLOYED

The standard crew for a loading unit at Lida B is 10 men, as follows: loader operator and helper, two cutters, two drillers, 1½ shuttle-car drivers (one man does other general work about half the time), and 1½ general men (track, ventilation and so on). Where the top is unfavorable, the number is increased by the number of men employed in roof-bolting or other support activities.

Output in the month of March was 18 tons per man at the mine, including six men engaged in hauling the product to the central preparation plant. On April 24 the average was 26½ tons per man.

For the men on the face units average output per shift for six weeks in March and April immediately prior to the preparation of this article was 40 tons. The maximum per man on the section up to that time was 50 tons. It is expected that further increases will be marked up in the future.

Exide-Ironclad
BATTERIES
ARE YOUR BEST POWER BUY— AT ANY PRICE

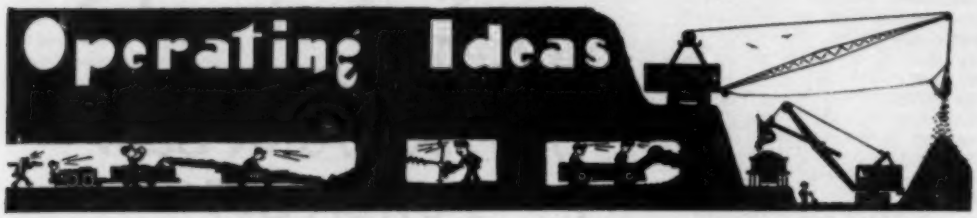
They PROVIDE ample power for fast, high-production haulage—more trips per shift, dependable round-the-clock performance, with no end-of-shift slowdown, no unscheduled down time . . . ASSURE inherent safety, with freedom from hazards of fire, fumes, noise . . . SHOW low costs of operation, maintenance, repair, depreciation. SIZES for all makes of battery-powered mine locomotives, trammers, shuttle cars. Call in an Exide Representative and let him prove these facts.

THE ELECTRIC STORAGE BATTERY COMPANY
Philadelphia 2

Exide Batteries of Canada, Limited, Toronto

"Exide-Ironclad" *Reg. Trade-mark U. S. Pat. Off.*



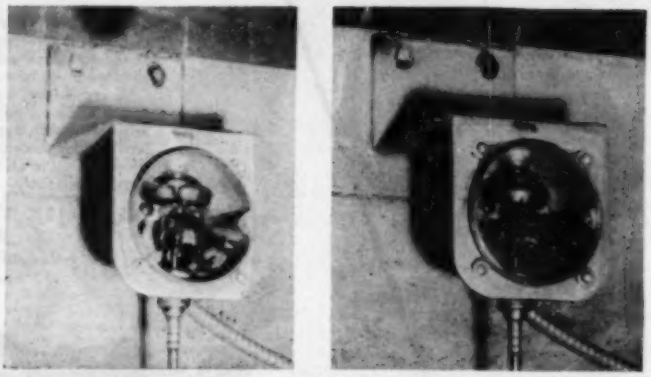


Feeder Control Prevents Crusher Plugging

TO PREVENT EXPENSIVE PILE-UPS and plugging of the 42x48 Flextooth crusher employed for breaking down mine-run at the Elkol (Wyo.) tipple of the Kemmerer Coal Co., a governor-type feeder control has been developed by Henry Garnick, master mechanic. What a pile-up might involve can be judged by the fact that coal is handled by the feeder and crusher at rates up to 730 tph.

The feeder control, shown in the accompanying photos, was made from an airplane tachometer. The hands were removed and the flyballs were used to tilt a mercury switch hinged at one end. The cable driving the flyballs was fastened to the end of the shaft of the slip-ring motor driving the crusher. The critical speed is 130 rpm. If trouble occurs and the motor shaft drops to that speed, the free end of the mercury switch is tilted down to break the circuit and stop the feeder

As the crusher clears itself and comes back to speed, the mercury switch is tilted up to horizontal position to complete the circuit and start the feeder. Additional protection for the crusher-feeder system is provided by a limit switch in the bin to stop the feeder if large lumps are encountered, and close setting of the overload relays to shut things down in case of an overload on the feeder.



TROUBLE-PREVENTER for Elkol crusher. At the left, with the crusher motor up to speed, the mercury switch has been raised to horizontal position by the action of the flyballs. At the right, the crusher motor has slowed down and the mercury switch has been tilted down to stop the feeder. A glass-faced cap over the unit was removed for photographing.



LUBRICANT STATION, plus use of thoroughly cleaned steel containers with tight caps, keeps lubricant clean and cuts waste.

Section Stations Improve Lubrication

MINIMUM LUBRICANT CONSUMPTION and positively clean oil and grease are the results of a policy of providing section stations and steel containers for distribution at the Kenilworth (Utah) mine of the Independent Coal & Coke Co. To keep containers from being thrown away all over the sections, with consequent loss and contamination, they are delivered to stations in each section and must remain there until taken outside for cleaning and refilling. A typical station is shown in the accompanying illustration.

The containers are original oil-company shipping containers, complete with caps. The latter are a definite item in the plan, as they are a major means of preventing contamination. The goal is to deliver to each section only the quantity of lubricants and hydraulic oil needed for the day. Guns and other equipment used by the men who handle lubrication are filled from the containers at the stations, and the oil or grease is applied immediately. Empty containers are returned to the outside storage station when the contents are used, and then are thoroughly cleaned before being refilled.

More "Work-Tested" Operating Ideas on pp 106, 108 and 109

GOULD

Plus-Performance Plan

. . . SHOWS YOU HOW

CORRECT CHARGING EXTENDS BATTERY PERFORMANCE!

Right now, the problem of conserving and extending essential battery power is urgent. Timely help is offered you by the GOULD PLUS-PERFORMANCE PLAN which can improve battery performance as much as 50%! Here is a complete system of manuals, articles, specifications, bulletins, record cards and charts which explains and illustrates how to select, charge and handle, maintain and determine the condition of your batteries.

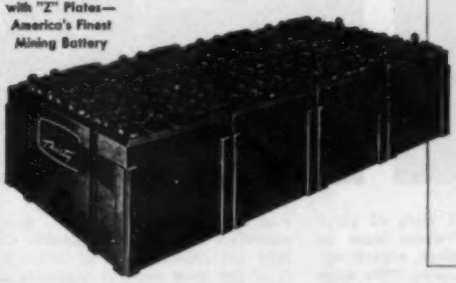
The material comprising the GOULD PLUS-PERFORMANCE PLAN is available to battery users without obligation. A request on your letterhead will bring descriptive literature by return mail.





Jib cranes make battery handling quick and easy.

The Gould "Thirty" with "Z" Plates—America's Finest Mining Battery



FOUR SIMPLE CHARGING RULES SAVE POWER

1. Do not overcharge. Use 22.5 amperes per 100 ampere-hours of battery capacity for 80% of charging time. Finish charge at 5 amperes per 100 ampere-hours. Correct charging will not cause gassing or overheating.
2. Give periodic equalizing charges. An extra 4-hour charge at the recommended finish rate at least once a month but not more often than once a week makes sure all cells are up to full charge.
3. Keep idle batteries charged. Batteries not in use should be given a freshening charge once every three months to prevent internal discharge, sulphating and eventual loss of efficiency.
4. Inspect charging equipment regularly. Make sure it is set correctly for the size of batteries to be charged. Inspect voltage relay timers frequently to assure accurate automatic cut-off. If ampere-hour method is used, check ampere-hour meter charts for correct settings.

GOULD

STORAGE BATTERIES

GOULD-NATIONAL BATTERIES, INC., TRENTON 7, NEW JERSEY

Always Use Gould-National Automobile and Truck Batteries

Efficient Trucks for Underground Fire-Fighting

1 Consol (W. Va.) Fire and Emergency Car Hauled by Jeep

EVER-READY EQIUPMENT for fighting underground fires, similar to the two-car unit shown in these photos from Williams mine, Enterprise, W. Va., is maintained at all properties of the Consolidation Coal Co. (W. Va.), Div. of Pittsburgh Consolidation Coal Co., to increase safety and protect valuable property. According to a recent issue of the *Consolidation Safety Bulletin*, the new chemical-extinguisher car and emergency brattice car replace three-car units which were formerly used.

The chemical car carries an engine, manufactured by Fyr-Fyter Co., which ejects carbon dioxide as the fire-fighting medium. The unit is recharged with Karboloy liquid and carbon dioxide cartridges.

For constructing brattices in fire areas the emergency fire and brattice car is equipped with tools and materials, such as, two jacks, nails, a saw, hatchet and ax, a pick and shovel, eight boards and brattice cloth, gas masks and rock dust.

Both the fire truck and its auxiliary, the brattice truck, can be easily hauled by a mine jeep, which are in service at all Consol (W. Va.) operations.





2 Philadelphia & Reading Unit Pumps Fog or Solid Stream





EQUIPPED with a 200-gal tank and a John Bean Royal pump, P&RC&I's new mine-fire truck, now housed at Potts colliery, Locust Dale, Pa., features interchangeable axles to permit use of the truck on either wide- or narrow-gage track at different properties. Also, the unit is equipped with a set of fittings to facilitate tank-filling from different sizes of pipes at various parts of water lines. In this regard, C. J. Decker, superintendent, Potts colliery, says, "We tried to equip the unit so that we would not have to waste time looking for a 20c tee if we're ever confronted by a mine fire."

The Bean pump is driven by a General Electric 20-hp 230-v DC motor controlled by a General Electric CR-1003 controller. The reel holds 200 ft of fire hose and the nozzle is adjustable for fog or solid-stream output.

The truck is fitted with bail hooks for slope hoisting and with conventional couplings for locomotive haulage.

All these Valves . . from One!

Valve combinations for 90% of industrial piping assembled with 4 bodies and a handful of parts.

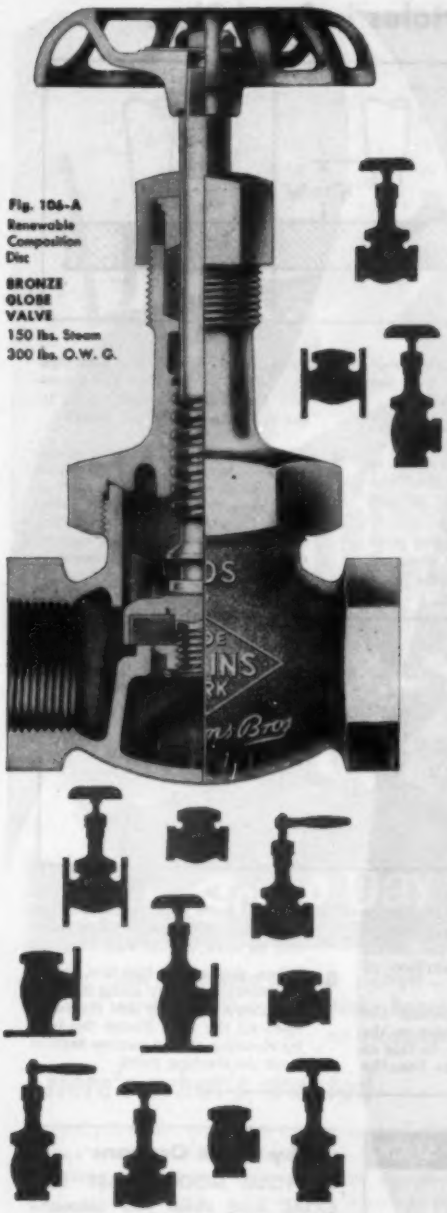
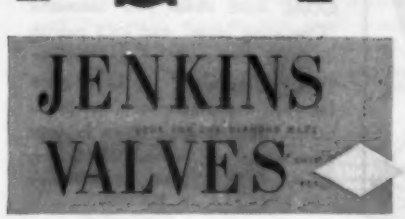


Fig. 106-A
Renewable Composition Disc

BRONZE GLOBE VALVE
150 lbs. Steam
300 lbs. O.W. G.



JENKINS FIG. 106-A "FAMILY"

Start with the standard Fig. 106-A. Trimming is interchangeable in Globe or Angle body, screwed or flanged.





For Close Control — In throttling service, the nut which holds the disc in the disc holder is removed and replaced with Throttling Nut, Fig. 344.



For Quick Opening and Closing — Merely substitute the bonnet and spindle from Fig. 941, in which threads are pitched more sharply.



For Lift Check Service — Globe or Angle Bodies can be fitted with interchangeable Cap, Disc Holder, and Guide Disc Nut from Fig. 117A. Addition of spring from Fig. 655A provides spring loaded service.



For Stop & Check Service — Use the 106A trim, but substitute this spindle from Fig. 630A and replace the regular disc nut with the check valve guide disc nut.

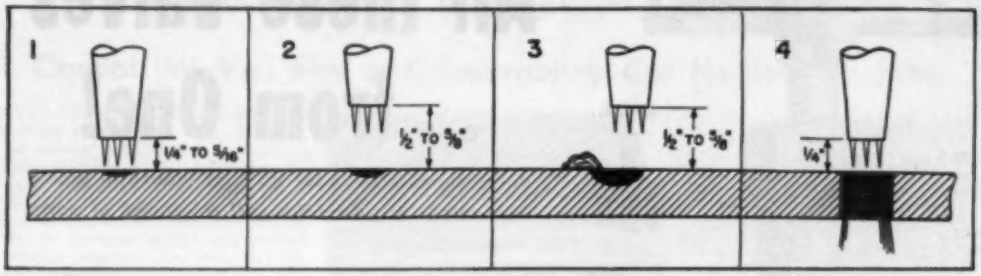
Look over these pictures and see how easy it is to make up just the valve type you need, simply by interchanging parts. Think of the saving this means in maintenance expense . . . in reduced inventory of spare valves in your stockroom.

That's a big reason why the Fig. 106-A series takes top honors in any poll for valve preference. And Jenkins time-proved design, makes them the longest-lasting, lowest-upkeep valves that money can buy.

For example, see the heavy construction of the one-piece, screw-over bonnet. You can remove and replace it over and over again without distortion. See the extra size packing box,—and the perfectly machined threads on the heavy manganese bronze spindle, with more threads in contact with the bonnet, open or closed.

Remember, Jenkins Bros. is the originator of the renewable composition disc valve,—the *only* manufacturer of both valves *and* discs. For drop-tight, trouble-free performance, get acquainted with the Fig. 106-A "family". Despite their extra value, *you pay no more* for Jenkins Valves. Jenkins Bros., 100 Park Ave., New York 17, N. Y. Jenkins Bros., Ltd., Montreal. Sold through leading Industrial Distributors.

Here's a Fast Way to "Drill" Holes in Steel Plate



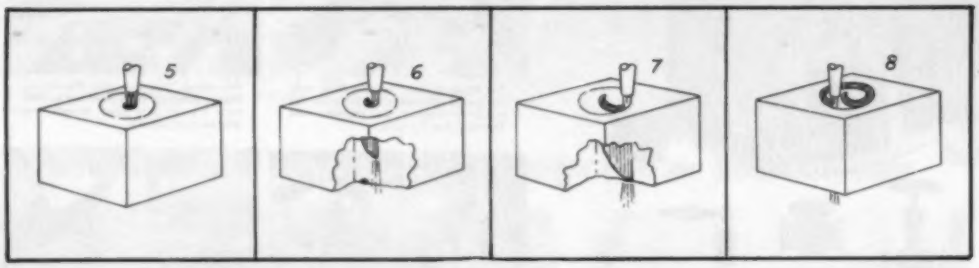
THIS METHOD of using an oxyacetylene blowpipe to cut holes in steel plate was presented in a recent issue of Linde *TIPS*, published by Linde Air Products Co. Flame adjustment is the same as for ordinary oxyacetylene cutting. By following these steps, keyed to the sketches above, holes for rivets, bolts and anchors are easy to make.

1 Hold the blowpipe steady and preheat a spot until it turns light red. Keep the end of the nozzle about ¼ in from the plate so that the inner cones almost touch it.

2 As soon as the spot turns light red, raise the blowpipe a little as shown. The surface will start to melt. If you do not raise the blowpipe, the slag may blow up and clog the nozzle orifices.

3 Depress the cutting oxygen lever slowly so that the slag does not blow up and scatter. At the same time, begin moving the blowpipe in a small circle. This helps control the slag by washing it to the opposite side of the puddle.

4 Keep the end of the nozzle about ½ to ⅝ in away from the plate and continue the circling motion until the cut is through the plate. Then lower the blowpipe as shown. Continue the same circling motion until the hole is the desired diameter.



For Holes in Thick Sections . . .

5 First mark the outline of the hole with chalk or a scriber. Hold the blowpipe at a point inside the area outlined, so that the cut will start in the section to be discarded.

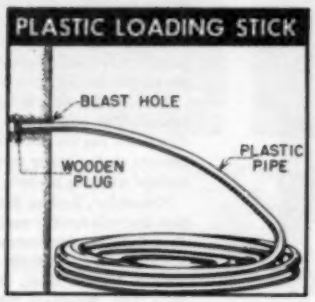
6 Gradually press down the cutting oxygen lever and at the same time begin moving the blowpipe toward the line. Hold the nozzle perpendicular to the surface of the work.

7 Move the blowpipe toward the line slowly and press down on the lever gradually. Try to do this so that when you reach the line, the cut will have penetrated through the entire thickness and the valve will be open all the way.

8 When you reach the line, move the blowpipe slowly along it. Keep the blowpipe steady and the valve open all the way. Finish the hole by cleaning off the narrow section near the starting point.

Plastic Pipe Aids Long-Hole Tamping

PLASTIC PIPE has been used with success in tamping long blastholes, according to short notes in recent issues of *Engineering and Mining Journal*. A coil of lightweight ¾-in plastic pipe, fitted with a wooden plug at one end, replaces jointed or segmented tamping sticks, thus providing faster, easier charging or horizontal or inclined long holes in confined metal-mine openings.



Why Make Orphans . . .

OF YOUR GOOD IDEAS? TELL COAL AGE about your successful "Operating Ideas" and we'll publish them for the benefit of other mining men. And we'll pay you $5 or more for each acceptable idea, on publication. Just describe them in your own words and write: The Editor, COAL AGE, 330 W. 42 St., New York 18, N. Y.

J&L STEEL



Set a definite day . . . soon . . . to start rounding up all the dormant scrap in your operation. Extra scrap is urgently needed to keep mills at expanded steel production.

Here's what's wanted

Steel producers must have scrap over and above the "working scrap" that you normally sell. Broken or obsolete machinery and equipment . . . odds and ends . . . worn out parts—in fact, *all* the iron or steel material that's rusting away in your plant or operation. Get it out of the way . . . get it on its way into production.

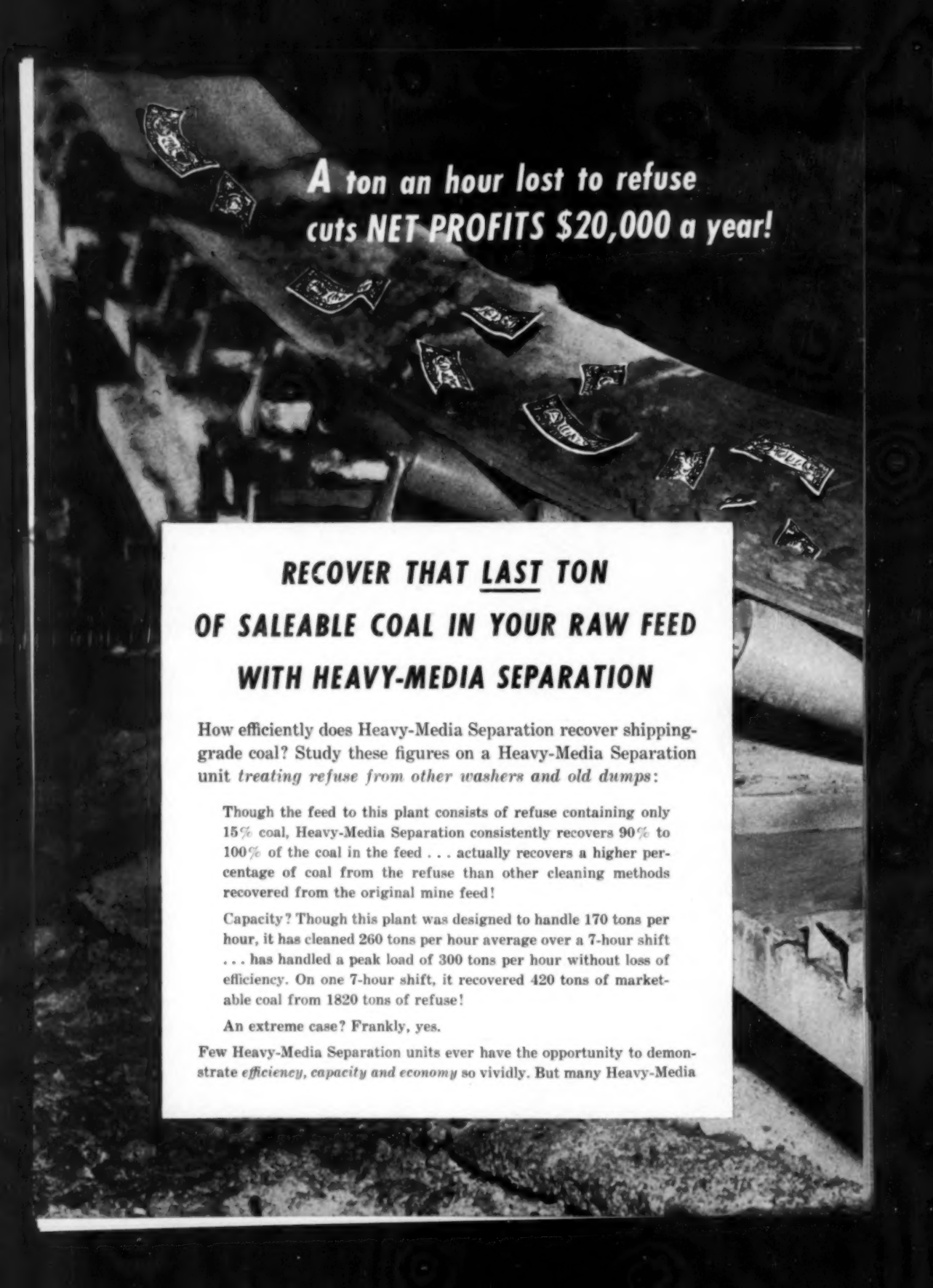
Here's what to do

Set a definite day to start . . . make scrap collection the definite responsibility of one man or one group. Call your scrap dealer. He'll take all the scrap you can collect and pay you well for it.

Set YOUR Scrap Day NOW!



JONES & LAUGHLIN STEEL CORPORATION
PITTSBURGH 30, PA.

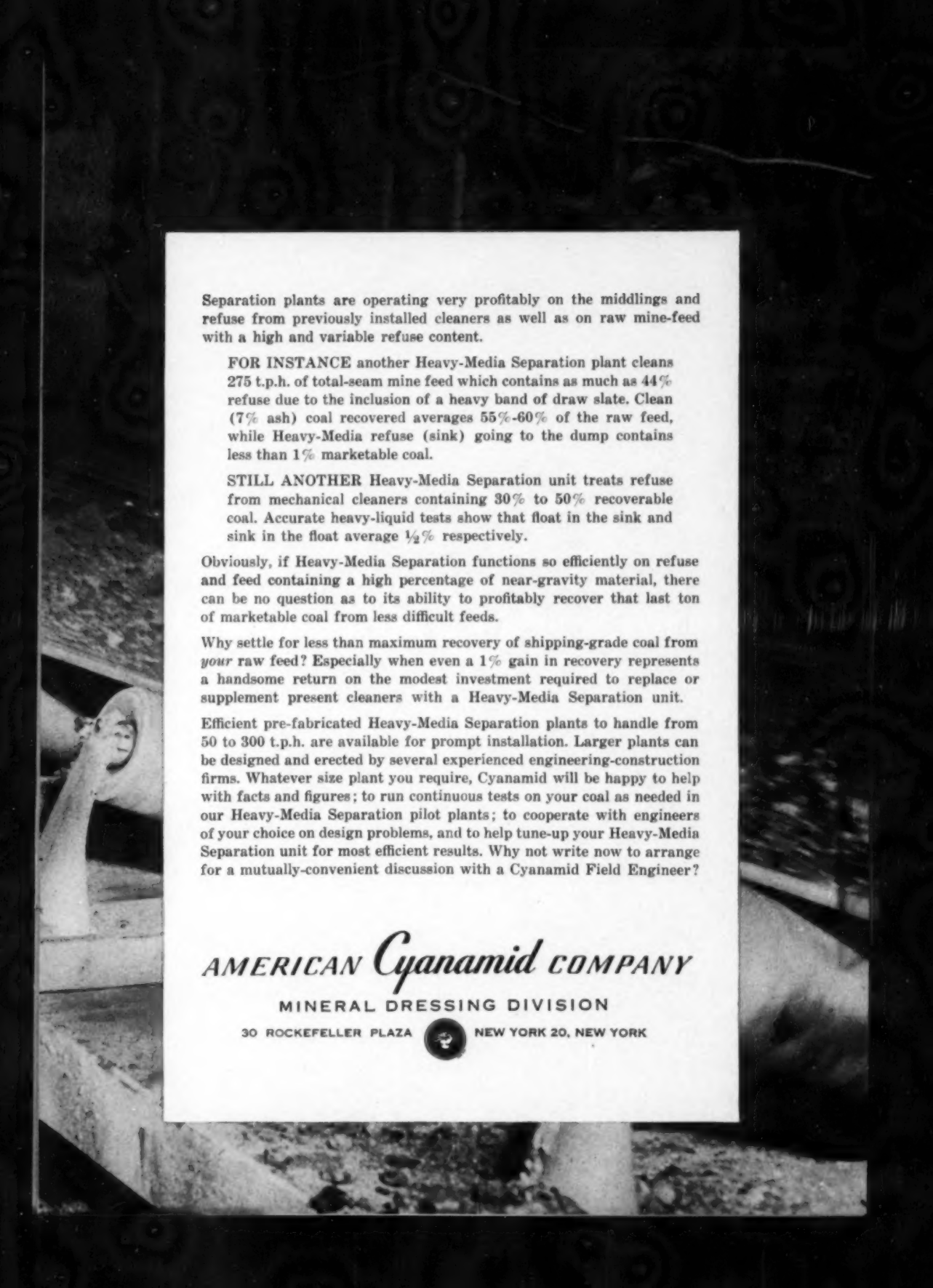


RECOVER THAT LAST TON OF SALEABLE COAL IN YOUR RAW FEED WITH HEAVY-MEDIA SEPARATION

How efficiently does Heavy-Media Separation recover shipping-grade coal? Study these figures on a Heavy-Media Separation unit *treating refuse from other washers and old dumps*:

> Though the feed to this plant consists of refuse containing only 15% coal, Heavy-Media Separation consistently recovers 90% to 100% of the coal in the feed . . . actually recovers a higher percentage of coal from the refuse than other cleaning methods recovered from the original mine feed!
>
> Capacity? Though this plant was designed to handle 170 tons per hour, it has cleaned 260 tons per hour average over a 7-hour shift . . . has handled a peak load of 300 tons per hour without loss of efficiency. On one 7-hour shift, it recovered 420 tons of marketable coal from 1820 tons of refuse!
>
> An extreme case? Frankly, yes.

Few Heavy-Media Separation units ever have the opportunity to demonstrate *efficiency, capacity and economy* so vividly. But many Heavy-Media



Separation plants are operating very profitably on the middlings and refuse from previously installed cleaners as well as on raw mine-feed with a high and variable refuse content.

FOR INSTANCE another Heavy-Media Separation plant cleans 275 t.p.h. of total-seam mine feed which contains as much as 44% refuse due to the inclusion of a heavy band of draw slate. Clean (7% ash) coal recovered averages 55%-60% of the raw feed, while Heavy-Media refuse (sink) going to the dump contains less than 1% marketable coal.

STILL ANOTHER Heavy-Media Separation unit treats refuse from mechanical cleaners containing 30% to 50% recoverable coal. Accurate heavy-liquid tests show that float in the sink and sink in the float average ½% respectively.

Obviously, if Heavy-Media Separation functions so efficiently on refuse and feed containing a high percentage of near-gravity material, there can be no question as to its ability to profitably recover that last ton of marketable coal from less difficult feeds.

Why settle for less than maximum recovery of shipping-grade coal from *your* raw feed? Especially when even a 1% gain in recovery represents a handsome return on the modest investment required to replace or supplement present cleaners with a Heavy-Media Separation unit.

Efficient pre-fabricated Heavy-Media Separation plants to handle from 50 to 300 t.p.h. are available for prompt installation. Larger plants can be designed and erected by several experienced engineering-construction firms. Whatever size plant you require, Cyanamid will be happy to help with facts and figures; to run continuous tests on your coal as needed in our Heavy-Media Separation pilot plants; to cooperate with engineers of your choice on design problems, and to help tune-up your Heavy-Media Separation unit for most efficient results. Why not write now to arrange for a mutually-convenient discussion with a Cyanamid Field Engineer?

AMERICAN *Cyanamid* COMPANY

MINERAL DRESSING DIVISION

30 ROCKEFELLER PLAZA NEW YORK 20, NEW YORK

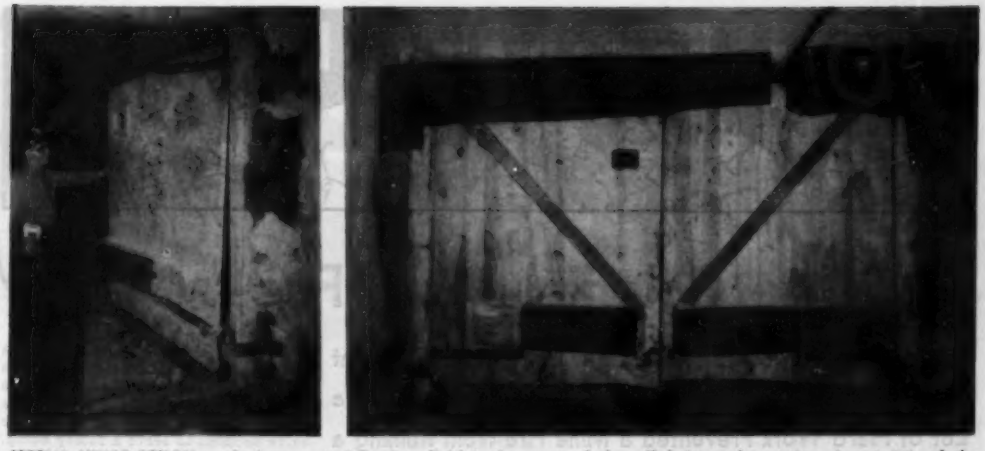
M-R-C's contribution to the
coal mining industry — SYNTHE-SEAL ball bearing



the **M-R-C** "*Synthe-Seal*" bearing
Pat. No. 2,467,049

A standard-dimension ball bearing with a removable synthetic rubber seal for keeping out dirt, grit and moisture and for keeping in lubricant.

MARLIN-ROCKWELL CORPORATION, *Jamestown, New York*



SPECIAL HINGE DESIGN on the lower part of the door (left) is the secret of the self-closing and centering characteristic of the Kenilworth door. The illustration at the right shows the door in closed position, with both leaves matching perfectly.

Two-Way-Swing Double Doors Close Automatically

TO FACILITATE MOVEMENT of men and trips while providing effective control of ventilating currents, management at the Kenilworth (Utah) mine of the Independent Coal & Coke Co. has worked out the two-way-swing self-centering double door shown in the accompanying illustrations in open and closed positions.

The secret is in the hinge design. The top hinge is of the conventional type. The bottom hinge, however, includes two posts on the frame, with a double contact on the door. The construction is shown in one of the accompanying illustrations. When the door is open, the weight of the leaf, plus a slight off-center cocking, causes it to swing back to center of its own accord. At this point, the two contacts on the door part of the hinge are solidly against both posts on the frame, holding the door in exact center position.

How to Get the Best Tire Mileage

TWO OF THE MOST IMPORTANT things you should do to get long, trouble-free mileage from your tires are: (1) maintain proper inflation and (2) avoid overloads, according to an article in a recent issue of Goodyear's *Magazine for MEN*.

Many truck operators fail to realize or to remember that it is the air—not the tire—that carries the load and as a result they do not make regular inflation checks.

The tire, with its tube, is in reality only a container which confines air under pressure so that the air can be put to work as a cushion to carry loads. Tires are made to withstand a certain amount of internal air pressure and at the same time resist external pressure, or load, with an allowance for normal flexing.

Overinflation of tires to handle overloads might seem advantageous at times, but usually it is a very harmful practice. Both the tread and body of a tire are put under extra tension by overinflation, thereby increasing the tire's susceptibility to cuts and bruises and reducing its ability to absorb road shocks. The contour of the tire will be rounder and therefore will have less traction surface on the road, resulting in more rapid wear at the center of the tread.

If overloading could be handled merely by putting more air in the tire there would be no need for more than one tire size. Overinflation is no substitute for correct tire size.

If a tire is overloaded or underinflated, the body bulges out and the cord structure in the carcass is subjected to a squirming strain that increases flexing action and tire temperature. The ability to flex under load and to absorb normal road shock and vibration is one of the principal advantages of the pneumatic truck tire, but it is necessary to maintain a proper balance between internal air pressure and external load if the tire is to flex properly and to give maximum service.

Abnormal flexing, which results in excessive heat, actually burns up tire life causing separation between cord body and tread or between plies, and by weakening the cords. Blowouts result. Underinflation also causes uneven tread-wear because the tire squirms more on the road.

Inflation and Tire Mileage*

Underinflation, %	Loss in Mileage, %	Mileage	Miles Lost
10	5	57,000	3,000
20	16	50,400	9,600
30	33	40,200	19,800
40	57	25,800	34,200
50	78	13,200	46,800

Loads and Tire Mileage*

	Increase or Decrease in Mileage	Mileage
30% underloaded	Plus 100%	120,000
20% underloaded	Plus 61%	96,700
10% underloaded	Plus 29%	77,400
Normal loading	0%	60,000
10% overloaded	Minus 18%	49,200
20% overloaded	Minus 30%	42,000
30% overloaded	Minus 42%	34,800
40% overloaded	Minus 52%	28,800
50% overloaded	Minus 60%	24,000

* Based on 60,000 mi arbitrary expectancy.

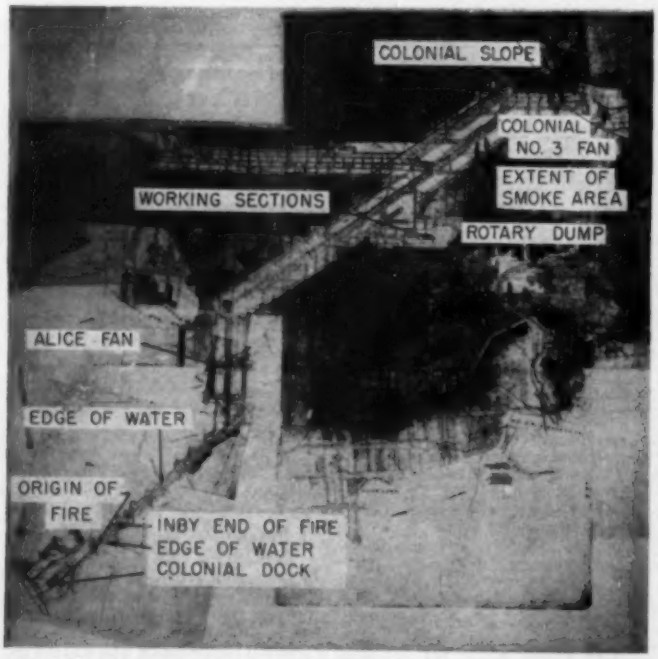


The Colonial Mine Fire—Part I

In This First of Two Articles Mr. Snell Begins His Account of How Effective Planning, Efficient Fire-Fighting and a Lot of Hard Work Prevented a Mine Fire from Ruining a Large Property

By WAYNE D. SNELL, Assistant Director of Mine Inspection
Coal Division, United States Steel Co., Pittsburgh, Pa.

A 5¼-MI-LONG BELT-CONVEYOR SYSTEM at Colonial mine, U. S. Steel Co., Fayette County, Pa., transports coal from the underground workings to barge-loading docks on the Monongahela River. From the docks, which are 50 mi upstream from Pittsburg, the coal is river-borne 28 mi downstream to Clairton Works, U. S. Steel Co.



SCENE OF FIRE and major landmarks are shown in this reduced composite of Colonial maps. Effective fire-fighting saved valuable property here.

The original belt system, installed in 1924, consisted of 19 sections which traversed a distance of 4½ mi. In 1944 the system was expanded to its present length by the addition of four more sections to serve a rotary dump.

The mine is ventilated by two fans. The Colonial fan ventilates that part of the mine between it and the mine-car rotary dump and about half the workings. The Alice fan ventilates the other half of the mine and the conveyor system outby the mine-car dump. Alice fan signals are installed outside the Alice fanhouse, in the hoist house at Colonial No. 3 and at the belt portal on the river. The signals are a blinking light and a horn at each location. The belt-drive motor rooms along the conveyor system are ventilated by separate splits.

Mine power is 550 v DC, but the belt system is powered from 2,300-v AC lines which enter the mine through the slope at the inby end of the belt and through three power boreholes. Lightning arresters, cut-out switches, and a circuit breaker are installed on the surface near each point of entry, and power circuits are equipped with hand-reset circuit breakers at the bottom of the shaft and at the foot of each borehole in the direction of feed therefrom.

A 4-in water line with 2½-in fire hose connections at intervals of approximately 500 ft and 1-in hose connections 100 ft apart are provided along the belt system. A fire extinguisher and two all-service gas masks are placed near each motor room.

FIRE DISCOVERED BY EXAMINER

About 3:20 pm, Tuesday, Oct. 31, 1950, fire was discovered in the belt heading at No. 5 motor room, 2,375 ft inby the river portal.

The belt had been idle 2½ hr prior to the discovery of the fire. About 35 min before the discovery, a mine examiner accompanied by a laborer had passed No. 5 motor room traveling by battery locomotive to the docks at the surface. The examiner re-entered the mine in a few minutes with the intention of traveling to Colonial No. 3

Abstracted from a paper presented to the Coal Mining Section, Western Pennsylvania Safety Council at Pittsburgh, April 25, 1951.

B.F.Goodrich



Universal tread gives 2-way traction over any hauling surface

THESE husky B. F. Goodrich Universal tires are made to order for tough mining operations. No matter what the hauling surfaces may be—crushed rock and broken limestone or slushy mud and water—the scientific tread design assures positive traction both forward and in reverse. They can be mounted in *any* position.

Built to give a lifetime of trouble-free service, these mining tires have the added protection of the *nylon shock shield*. Extra strong, elastic nylon cords are built in between the tread rubber and the cord body. Under the sudden impacts and shocks of mining operations, these cords work together—absorbing and distributing the shock evenly. This patented B. F. Goodrich feature is found on all BFG truck tires of 8 or more plies. And remember, *only* B. F. Goodrich has this safety feature which results in additional savings through (1) longer tire life (2) more recappable tires (3) greater bruise resistance and (4) less danger of tread separation.

Other BFG tires are available to meet the needs of *all* types of mining operations—both deep mine and stripping. You'll want to learn more about these tires that give better service, longer life and lower operating overhead. For complete information, see your local BFG dealer or write direct. *The B. F. Goodrich Company, Akron, Ohio.*

RESEARCH KEEPS
B.F.Goodrich
FIRST IN RUBBER

mine and discovered the fire burning.

At the outbreak of the fire it was thought by management that it was confined to No. 5 motor room. However, according to eyewitnesses and evidence at the scene, the ignition occurred outside the motor room over the belt.

Upon discovering the fire, the examiner notified the outside office at the docks and dispatched two belt repairmen, who were working at No. 2 belt transfer chute, to the surface for fire hose. He then took a dayman to the scene to fight the fire, using a sprinkling hose available nearby. He intended to stop any advance of the fire until the fire hose could be brought in and connected to a fire plug near No. 4 motor room.

The superintendent at Colonial No. 3 office was informed by telephone that an electrical breakdown stopped the Alice fan. Immediately thereafter he received notice of the fire at No. 5 motor room. He notified the mine foreman at Colonial No. 3 of the fan stoppage and directed him to withdraw the men from the mine.

Workmen had made several attempts to fight the fire at close quarters. However, their efforts were ineffective because they were repeatedly driven back by smoke, a result of the Alice fan stoppage.

After the men were removed from the mine little time was lost in getting a sufficient volume of air over the fire by sealing the Alice shaft and using the Colonial fan. This permitted direct fighting of the fire with standard fire hose as the smoke retreated.

A river boat of the Carnegie-Illinois Steel Co. was called and upon its arrival at Colonial docks about 6:30 pm it was moored so that its pumping facilities could be used if needed.

ROOF-FALL HAMPERS EFFORTS

About this time, members of the mine-rescue team arrived with self-contained oxygen breathing apparatus and immediately participated in fighting the fire. To this point progress was satisfactory, and management believed the fire would soon be under control and extinguished. However, the roof collapsed at the No. 5 motor room, and while workmen continued to build cribs and set posts on top of the fall to follow the fire the fall progressed to such proportions that it seriously hampered their efforts.

The general superintendent then was notified that control of the fire was lost and, while workmen would continue to fight it from the river end, it would be necessary to divert the greater portion of air from the belt heading to the first right parallel heading. This would be done to (1) reduce the air traveling over the fire to a minimum and (2) provide ample air for rescue men to explore the parallels to the right of the belt heading to determine the extent of the fire and the feasibility of fighting it from both ends simultaneously. To accomplish the purpose, a canvas stopping was placed across the belt heading and a stopping opened into the adjoining parallel, after which the rescue men made the necessary exploration, advancing to the first crosscut inby No. 6 motor room, 1,185 ft inby No. 5 motor room.

It then was decided to move to the Colonial No. 3 side of the fire and resume fire-fighting operations from there. This move required sealing all openings on the river end. Then provisions were made to erect air-lock doors in the belt entry at the river end, the first being placed 1,200 ft inby the portal. Concurrently, a centrifugal fan was installed for ventilating the belt entries on the river side. This was done to effect prompt and safe re-entry into the fire area from that location. Eight stoppings were installed in old workings to isolate what eventually would be the return air course to this fan.

CARBON MONOXIDE ENCOUNTERED

At about 3 pm, Wednesday, Nov. 1, company, state and federal officials with a rescue team entered the mine at Colonial No. 3 shaft and advanced to the lock doors at the rotary dumps. At this point it was determined that further progress would be hazardous until Alice fan was in operation. The carbon monoxide content in the return inby the lock doors at the dump was 0.3%. The party retired to the heading beyond No. 1-A motor room, approximately 1,000 ft from the lock doors.

Immediately after the seals were constructed and inspected, the Alice airshaft and the territory at the foot of the shaft were explored. Then a set of lock doors separating the belt headings and the Alice return were opened. This speeded the clearing of smoke out of the belt headings from the rotary dump to a distance of 12,000 ft.

HOW CO WAS ELIMINATED

After the exploration crew returned to the surface, the emergency doors on the intake between Colonial No. 3 shaft and the belt heading were opened, and the Alice fan was started to provide a free flow of air to the affected area. The balancing regulator between the Alice fan return and the Colonial No. 3 fan return was completely removed during the effort to use the No. 3 fan at the docks, and it now was replaced by a solid stopping.

Completing in the next Foremen's Forum his blow-by-blow account of fighting the Colonial fire, Mr. Snell tells of effective plans, further troubles, great effort and eventual success. Don't miss it!

When this solid stopping was completed, the belt heading was explored from the rotary dump to the Alice fan doors, a distance of 12,000 ft. The rescue team with self-contained oxygen breathing apparatus led, followed by company, state and federal inspectors. Periodic tests for carbon monoxide were made but none was found.

At the Alice fan doors the rescue team removed a regulator stopping inby the doors in the fan return to improve effective air-flow through the belt headings and to facilitate their advance toward the fire. The doors between the belt headings and Alice return then were closed, returning Alice fan to normal operation except for the river intake.

In exploring the area, five members of the rescue team stayed at the fresh-air base outby the last open cut-through, and five others, using a life-line, explored to a place where an appropriate stopping was located. After removing that stopping the last open cut-through was closed, thus advancing the air and clearing the belt heading to the new stopping. This practice was followed for a distance of 700 ft outby No. 7 motor room.

Subsequently the regulator at No. 7 motor room was closed, advancing the air to the crosscut inby No. 6 motor room which had been opened by the rescue team in their exploration of the parallels the night the fire occurred. At this point, 7,000 ft outby Alice fan, a fire on the belt was encountered and extinguished. Beyond, the fire was very active, resulting in deterioration of the roof, which made establishment of effective roof protection necessary before further progress could be made.

WATER ANOTHER OBSTACLE

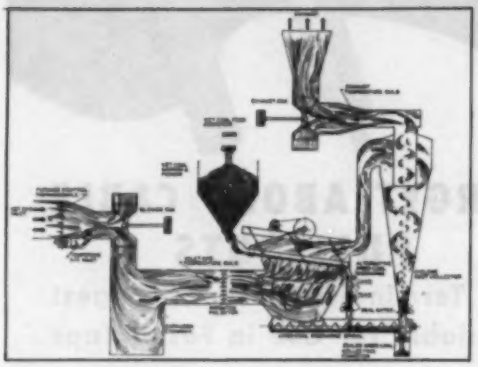
In advancing to the fire, the rescue team had to wade 1,150 ft through a water pool from 150 ft outby No. 7 motor room. The maximum depth of the pool was 54 in outby the junction pump-room, and it was a major obstacle.

Although arrangements had been made to pump the water, it was finally decided that since much of the belt was submerged and therefore under secondary protection, and since Alice fan had reached its limits and could not provide sufficient air for further advance, it would be advantageous to retreat to the water's edge outby No. 7 motor room and build 8-in wet-wall concrete-block seals in the three entries. The seal in the belt heading (intake) and the seal in the second parallel (return) were equipped with drop doors, which were provided to insure uninterrupted ventilation during the construction of seals and to facilitate rapid isolation of the affected area at the proper time.

It then was decided to move to the river end of the belt heading to continue fire-fighting operations.


FORGET ABOUT CABLE PULL-OUTS
O-B Terminals are the Strongest Available for Use in Fused Taps
Fastening cable about a binding post may make a good connection for a fused tap, but it takes time. It's a fussy job to form a loop in heavy cable and hold it in place while the post is being tightened. While it will hold most of the time, it just isn't as strong as a fused tap cable connection can be, and those 'once-in-a-while' pullouts usually tie up a lot of production.
Why not simplify matters with a fused tap terminal that really holds on? The O-B Form-H and Form-J Taps have the strongest cable-gripping terminals available for use in fused taps.
The set screw type H-1 terminal and the cam type H-2 terminal cover a range of cable sizes from No. 6 to 2/0, and both can hold tight enough to break the cable rather than let it slip. Fastening the cable to either is an easy job—just slide the bare cable end into the terminal hole and tighten the set screws or hammer the cam into position. Whichever you use, you've got a cable connection that will stay put!
Get away from pullouts and production delays with O-B Form-H and Form-J Taps. They really hold on! Your O-B representative has these taps ready to show you.
4098-M
(B)





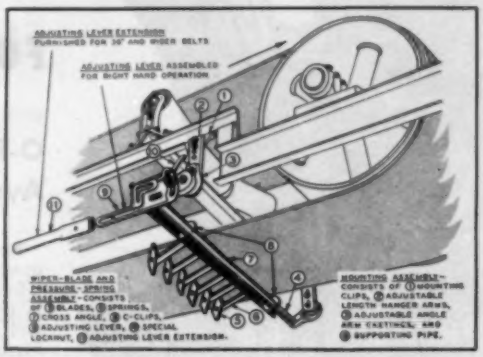
New Unit Dries Fine Coal Efficiently (1)

Fine-coal drying without dust, degradation or air pollution now is possible with the new improved McNally Pulso unit, a thermal dryer of the up-draft type, the maker reports. Built to dry the hardest fractions from ⅜ in to 0 and available in various capacities, the Pulso dryer brings drying gases in direct contact with coal by both forced and induced draft as the coal flows over a reciprocating screen. The pulsating action of the drying gasses permits full contact with the coal particles for rapid and efficient heat transfer while facilitating dropping of extreme fines through the screen to prevent their being carried off into the exhaust system. Control of the unit is fully automatic and surface moisture can be controlled to suit market requirements. Bulletin 551 offers full data.—*McNally Pittsburg Mfg. Corp., Pittsburg, Kan.*



22-Ton Trucks Offer Choice of Engines (2)

Two new Euclid rear-dump 22-ton-capacity trucks featuring a spring-mounted drive axle are the Model 45TD powered by a 286-hp Buda engine and the 46TD equipped with a 300-hp Cummins engine. Top speed with a full payload is 32 mph and both models have a 10-speed transmission and are available with a standard or quarry body, or with an optional heated body that speeds dumping during cold weather. A smooth ride and faster travel speeds are facilitated by mounting of the Euclid double-reduction planetary-type drive axle on free-floating springs and positioned to the frame by swivel-connected longitudinal rods, which permits movement of the springs in the spring brackets and avoids leaf breakage from twisting on rough roads. Bulletin 121 covers both units.—*Euclid Road Machinery Co., Cleveland 17.*



Cleaner Adaptable to Existing Belts (3)

The S-A spring-type conveyor-belt cleaner consists of self-aligning spring-steel wiper blades set perpendicular to the belt surface and diagonal to the belt travel that wipe the belt clean and dry as it passes. Spring arms supporting the blades maintain a uniform pressure on the belt and permit the blades to easily ride over obstructions such as splices. Since the unit has an independent mounting assembly, it can be easily adapted to fit existing conveyor installations and adjustments and replacements can be made from either side without interrupting conveyor operation, the maker says. Bulletin 651 giving full details available from *Stephens-Adamson Mfg. Co., Aurora, Ill.*



Mine Power Center Is Skid-Mounted (4)

New Westinghouse ventilated dry-type mine power center is an integral skid-mounted unit consisting of a high-voltage section, and a transformer and low-voltage section, and featuring a compact low-height design, 36

Mine Official Reports 37.5% Lower Bit Cost

Officials in an Armstrong Co., Pa. mine report that Kennametal Mining Machine Bits result in 37.5% more cutting per bit life as compared to other carbide bits that have been used. Total tonnage: with other carbide—3,126 tons, with Kennametal—4,994 tons. Service between bit changes was increased from 9 places to 14 places. Bit life was 37.5% longer.

●

Matthews, Moore Coal Co., Gets Answer to Power Problem



Results of power test made for Mr. Claude Matthews, Supt., Moore Coal Co., Devonia, Tenn., show that Kennametal U-5-H Bits require 29% less power than steel bits. Test was made by a West Virginia consulting company. Particulars are: The machine using steel bits averaged a load of 52 H.P. on the motor while Kennametal averaged 37 H.P. or 29% lower average power. The machine which was rated at 50 H.P. operated at a 2 H.P. overload when steel bits were in service.

●

Bit Cost Reduced to .58 cents per ton, Clymer No. 2 Mine, Clearfield Bituminous Coal Corp.



J. F. Simpson, Mine Superintendent, says, "We have used Kennametal Bits for three years and they have cut 284 places per set." Prior to the use of U-7 Bits at the mine, complete bit changes or resettings were made on each place that was cut. Bit cost averages only .58 of one cent per ton.

●

Booklet on Mining Bits Available for the Asking

New styles, sizes, prices and performance data on Kennametal Bits are available in new Mining Catalog M-6 published by Kennametal. You can have a copy by writing us and asking for it.

(Advertisement)

Duquesne Light Co.'s Harwick Mine

Reduces Cutting Cost



with Kennametal Bits



James H. Truax, mine superintendent, says, "We checked the performance of 100 Kennametal U-4 Bits and found that they gave a bit cost of $ .0026 per ton, which we consider very good." The cutting was done in a section of the mine where the coal was only medium hard to cut, and in other sections where it was more difficult, the U-7 was put on test. The record there, according to James Truax, was also satisfactory. He says, "The U-7 Bits have helped to make a difficult cutting job easier and more profitable." In this cutting, 14 places were cut between bit changes and 50 places were cut per set of bits.

Beside lowering bit cost, other advantages that are obtained by using Kennametal Bits are more efficient cutting because fewer stops are made to change or set bits, a large saving is also made on machine repair because the bits stay sharp and allow it to cut freer, and due to less changing and fewer dull bits, the cost of bit reconditioning is greatly reduced.

One of our service representatives who deals only in cutting and drilling problems will be glad to explain how Kennametal Bits can be cost-savers for you. Kennametal Inc., Latrobe, Pa.

The name of your nearest Kennametal representative can be found in your McGraw-Hill Mining Catalog. Contact him today.

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Bits for Every Cutting & Drilling Need

in high, 45 in wide and 104 in long. The high-voltage section consists of a cable disconnecting plug and receptacle (optional) and a primary circuit breaker if desired. The low-voltage section may have as many as four "L" frame breakers. Cable receptacles provide for connection to low-voltage feeders and each breaker is equipped with ground-fault protection. The transformer is a horizontal Type AVR triplex unit, three-phase, 60 cycles, 80 deg C rise with dry-type Class B insulation, and utilizes direct air cooling. The unit is available in ratings of 112.5, 150, 225 and 300 kva, with high voltages of 2,400/4,160 and low voltages of 480/240, delta. Full data from *Westinghouse Electric Corp., Pittsburgh 30.*



Bulldozer Matched to Rubber-Tired Tractor (5)

New No. 10S bulldozer, a straight-blade unit now available for use with Caterpillar DW10 tractors, is similar in design to the company's other bulldozers and utilizes a No. 21 cable control. The weight box and frame group, which differs markedly from that of the company's track-type tractors, is fabricated of heavy structural-steel plate mounted in conjunction with the DW10 tractor frame. It not only provides support for the bulldozer trunnions at each side of the tractor but includes a heavy box at the rear of the tractor to accommodate four counter weights weighing 7,000 lb, which are offered separately to provide more traction on the driving wheels. More details from *Caterpillar Tractor Co., Peoria, Ill.*

Electronic Scale Simplifies Weighing (6)

Unusual compactness and ease of installation, operation and maintenance in comparison with the usual complicated and bulky lever systems presently in use are features cited by Streeter-Amet for its recently developed electronic scale and recorder readily applicable to dormant or motion weighing. In addition, the electronic scale may be installed at more convenient weighing points where a lever system might be impractical or impossible to install. Also, the electronic unit may be easily used to record and print weight data at a point remote from the scale with more accuracy, the company says. Maintenance is simplified because of the interchangeability of the load cells and recorder components, which can be easily replaced without costly tie-ups of the scale. On a large-capacity scale, several smaller ranges are used to permit easier and more accurate readings and changes in range may be readily accomplished with electronic unit, it is said. Full details are available from *Streeter-Amet Co., Chicago 13.*

New-Type Transformer Is Vapor-Cooled (7)

Expected to be one-quarter to one-third lighter than liquid-immersed units of equivalent ratings and performance, a vapor-cooled vapor-insulated transformer being developed by Westinghouse features a new cooling technique that utilizes the heat of evaporization of liquid fluorocarbons for cooling, and the dielectric strength of fluorocarbon vapor for insulating. The unit will be as safe or safer than liquid-immersed or dry-type transformer, it is said, because the fluorocarbon liquid is not only non-flammable but has fire-extinguishing properties. While commercial units are not yet available, the vaporization-cooled transformer may be expected to provide the most suitable and economical answer where safety not obtainable with liquid-immersed units is required, where space and voltage requirements rule out dry-type transformers and where extremely compact installations with forced external cooling or a remote cooler are needed, the company says.—*Westinghouse Electric Corp., Pittsburgh 30.*



Capacitor Motors Built in New Type (8)

General Electric's Tri-Clad line of single-phase capacitor motors has been extended to include a totally enclosed fan-cooled construction available in ratings of 1, 1½, 2, 3, and 5 ph. Features include starting capacitors and switch mounted within the frame to provide maximum protection with minimum space requirements. The new line was developed for use where extra severe conditions of dirt, grit, or moisture are encountered and also is offered in explosionproof and dust-explosionproof construction. Except for the 5-hp size, which uses 230 v only, the new motors operate on 115/230-v 60-cycle power supply.—*General Electric Co., Schenectady 5, N.Y.*



Transformer Design Cuts Weight by 30% (9)

Its new line of general-purpose, dry-type transformers featuring Class B insulation for single-phase, 60-cycle operation, provides smaller transformers at an average weight reduction of 30% throughout the line, according to General Electric. These size and weight advantages are obtained, it says, through use of improved core steels and increased amounts of inorganic insulating materials, for a net result of less copper and steel per kva of output. Certain ratings of the new line are available immediately and it ultimately will consist of about 50 models in ratings of 3 kva and upwards. It will include transformers equipped with two 5%-rated-kva taps below rated primary voltage, transformers for 32-v applications, and units for boosting and bucking applications and general light and power service. —*General Electric Co., Schenectady 5, N. Y.*

10-Speed Transmission Adds Overdrive (10)

Incorporation of overdrive in the latest model of the Fuller 10-speed Roadranger transmission adds to the flexibility of this "one lever—no gear splitting" unit developed to meet the demands of heavy-over-the-highway hauling where severe conditions prevail, the maker says. With overdrive in the Model R-960-C, a gear ratio of 0.779 is added to the high range, which incorporates additional ratios ranging from 2.10 to 1.00. The Roadranger provides low range ratios of 7.45 in first to 2.76 in fifth. Reverse gear ratios are 9.89 in the low range; 2.78 in high range. It is built, like the non-overdrive R-95-C, in SAE No. 1 and No. 2 clutch-housing sizes. Features of the Roadranger, offering higher road speed and fuel economy and a one-third reduction in shifting, include 10 selective gear ratios evenly and progressively spaced; quick easy shifts

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No haul too tough . . . no coal too rough for Quaker Conveyor Belts. That's why they are used in the leading mines throughout the nation. Belts that assure minimum of maintenance and low cost conveyor operation.

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Quaker Transmission Belting is pre-tested for maximum horsepower transmission. Available for all types of drives—from fractional horsepower to the largest installations.



HOSE FOR RUGGED WEAR
There's a Quaker Hose for every use in the coal industry—from the air hose on the lowest level to the water hose in the washer.



FOR SAFETY . . . ALL WAYS
Quaker's Mine Trolley Cable Guard offers protection for mine cables. It is specially compounded of synthetic rubber to resist mine damp, acid and water. It is also resistant to fire which adds an extra safety margin and prevents breakdown.

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in 28% steps; and range shifts that are pre-selected, automatic and synchronized, according to the manufacturer.—*Fuller Mfg. Co., Kalamazoo, Mich.*

Heater Speeds Screening Of Moist Materials (11)

Hannon electric screen heater, applicable to woven wire screen, No. 2 mesh or smaller, on either new or old gravity-or vibrating-type installations, consists of a specially-designed high-efficiency stepdown transformer which converts 220, 440 or 550 AC to low-voltage heating current, which is then delivered through high-amperage cables to special bus bars extending the full length of the screen on each side. The screen acts as resistance to flow of the low-voltage current and is heated sufficiently to reduce moisture content of the material as it passes over the mesh, thus eliminating blinding. Installation may be made by plant electrician. Literature from *F. R. Hannon & Sons, Canton, Ohio.*

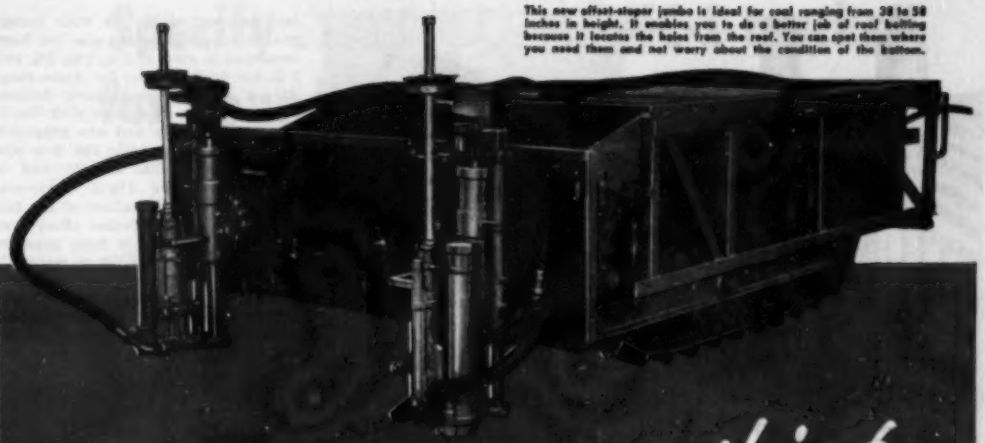


Tractor Sweeper Has 5-Ft Broom (12)

New Meili-Blumberg sweeper specially designed for the Ford tractor features a broom that may be attached or removed within a ½ hr; fingertip-power hydraulic control that raises the broom 8 in; tilt that adjusts broom to surface; and a full-length dust hood protecting operator, the maker says. The broom is driven by rear power take-off at fixed ratio to engine speed, thus providing efficient sweeping at all tractor travel speeds, and sweeps a 5-ft swath at a 30-deg angle to deposit debris outside the tractor wheels. Either fibre or steel brushes are available. Full data from *Meili-Blumberg Corp., New Holstein, Wis.*

Current Transformers Used Inside or Outdoors (13)

Introduced 2 yr ago for indoor current transformers, the butyl-molding process has now been applied to an entirely new line of GE current transformers, the first developed for both indoor and outdoor application. Applicable on single-phase and polyphase circuits, the butyl-molded 600-v units were designed to reduce users' stock requirements and help cut inventory costs. The butyl insulation



This new offset-stoper jumbo is ideal for coal ranging from 38 to 58 inches in height. It enables you to do a better job of roof bolting because it locates the holes from the roof. You can spot them where you need them and not worry about the condition of the bottom.

Here's the latest thing in Roof Bolting

A New Offset-Stoper Jumbo by Le Roi-CLEVELAND

Check these features and you see why this revolutionary jumbo makes roof-bolting faster, easier, more thorough.

NOW you can do your roof-bolting jobs faster and better than ever. The new Le Roi-CLEVELAND offset-stoper jumbo does all the hard work — carries the stopers, the drill steel, in fact all the material needed for a full shift of roof bolting. Your miners are less tired — get more done. Here's why:

Mobility

The jumbo is mounted on an electrically driven (permissible) crawler tractor. It gives you three forward speeds up to 3 mph and one reverse speed (1 mph). Mercury clutch for smooth operation. Brakes for turning. Side driver seat with full controls for travel in either direction.

Faster drilling and bolting

Jumbo carries 2 Le Roi-CLEVELAND S-11S offset-stopers, each with 12-inch steel change. The feed-legs of these stopers do two jobs — raise the machines to drilling position and position the dust collectors at the drilling face. All controls are conveniently located so that you can drill holes, drive bolts, and set nuts with one set-up.

Positive dust control

On this new unit, there's a separate dust collector for each stoper drill. The fines are deposited as follows: 95% in a primary tank and 5% in a filtered secondary tank having a filter area of 60 sq. ft. for each stoper.

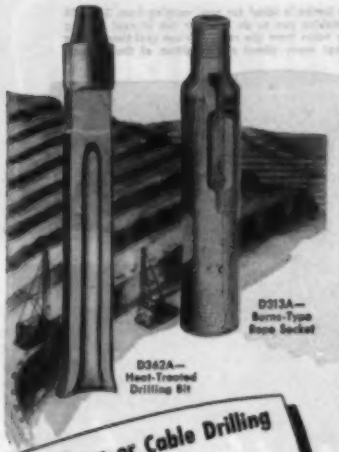
Add all these things up and you have the latest thing in roof bolting. Try this new unit in your property. Watch your costs drop, production rise. Write for complete details.

LE ROI

LE ROI COMPANY

RD-50

CLEVELAND ROCK DRILL DIVISION
12500 Berea Road, Cleveland 11, Ohio
Plants: Milwaukee, Cleveland and Greenwich, Ohio



For Churn or Cable Drilling
of
• BLAST HOLES
• PROSPECT HOLES
• SAMPLING
SAFE • EFFICIENT • ECONOMICAL

Spang Churn or Cable Tools are top performers in their fields for drilling test holes when prospecting or sampling . . . drilling blast holes for fragmentation of minerals or overburden . . . drilling and reaming escape, dewatering and ventilating holes . . . and drilling wells for other purposes. Fifty years' experience serving oil, water-well, mining and quarrying operations assures their value.

D486—Reamer-Type
Pilot Bit

LARGE BITS
for pilot hole drilling and stage enlargement reaming of dewatering, ventilation and escape holes.

D370F—Prefabricated
Star Bit

SPANG CABLE TOOLS
SPANG & CO., BUTLER, PA.
for
• SHOT BLAST HOLES • WELL DRILLING
• PROSPECT DRILLING • SAMPLING



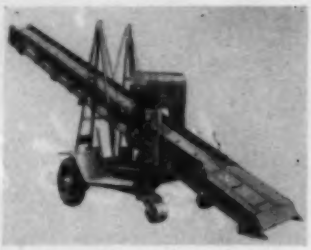
combines low moisture absorption, good corona and sunlight resistance, excellent adhesion to copper, very low power factor and good resistance to mechanical damage, GE reports. By using butyl, expensive porcelain and metal cases are eliminated, and the molded insulation permits compact designs meeting standard mounting dimensions for indoor applications while completely waterproof for outdoor service. First of the new line is Type JKP-O, a 600-v window-type current transformer with primary ratings of 200-, 400-, and 600-amp designed to carry 200% of rated primary current continuously.—*General Electric Co., Schnectady 5, N.Y.*



Mining-Machine and Auger Drill Bits (14)

A new Kennametal tungsten-carbide-insert mining-machine bit (above) is available for severe service conditions such as cutting into roof and bottom rock, partings, binders and embedded rock. The insert is deeper and narrower than the standard Kennametal bit to provide greater resistance to shock, the maker states. Several shank sizes permit its use in most units in continuous or regular service.

A new line of Kennametal tungsten-carbide-insert drill bits with hexagonal-shank construction also has been developed in sizes of 2¼, 2½, 2¾ and 3 in. for drilling holes for Armstrong, Airdox and Cardox blasting devices. The first three fit augers with 13/16-in hexagonal sockets and are adaptable for 1-in sockets, while the 3-in size fits 1-in hexagonal sockets and is adaptable to the 1¼-in hexagonal sockets. A special feature of the bits is a web-type core breaker offset from the center to give it both pressure and impact for breaking up materials so they can be conveyed, it is said. A new 2½-in auger with a 13/16-in hexagonal socket also is being added to the line.—*Kennametal Inc., Latrobe, Pa.*



Troughed-Belt Conveyor Is Power-Moved (15)

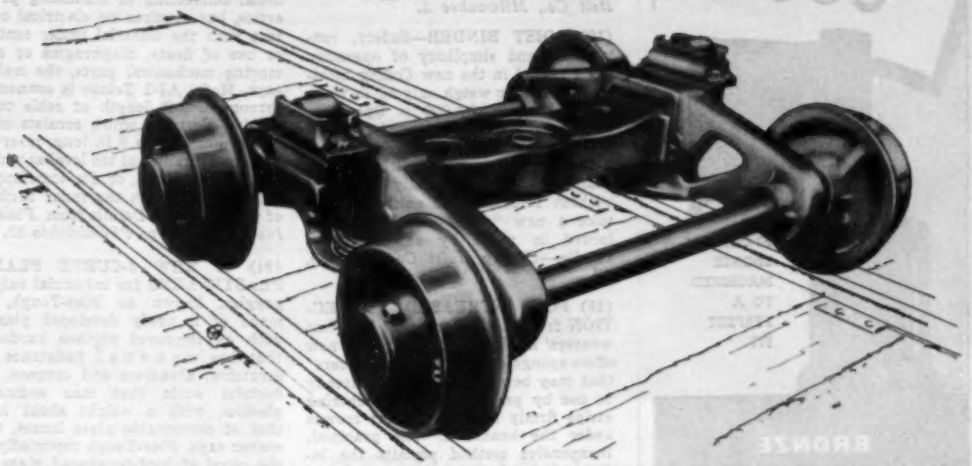
New heavy-duty material-handling conveyor, Fairfield Model 638 power-moved troughed-belt conveyor (above), is especially designed for greater economy and higher handling speeds, the maker reports. The unit features a new simplified drive and controls, improved maneuverability of individual wheel steering, hydraulically operated boom hoist, self-equalizing castors for balance in yard operations and a heavy-duty frame and chassis design, it is said. The manufacturer's Model 666, a lightweight troughed-belt conveyor is said to offer high loading speeds, handling 75 yd of sand or gravel per hour, for example. Lengths from 14 to 25 ft are available, with additional lengths upon request. Complete details on Models 638, 666 and other Fairchild conveyors are given in Bulletin 450 available from the *Fairfield Engineering Co., Marion, Ohio.*

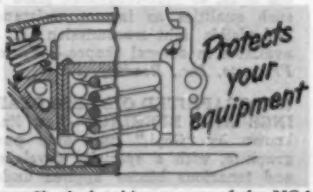
Equipment Shorts You'll Want to Check

(16) MOVING MACHINERY PARTS may be protected from liquids, dust and other foreign material with the new telescopic accordion sleeve made of "Gortite," which has a neoprene base and is impervious to oils, greases, gases and water, withstanding a temperature range of minus 60 to plus 180 F, the maker says. Mold developed with rubber types is eliminated and the sleeves have been made in sizes from 1 to 12 in ID and in lengths of 2 to 30 ft.—*A&A Mfg. Co., Milwaukee 3.*

(17) CONCRETE MIXER—New Rex 6-S unit is built for fast production on jobs needing a 6-cu ft mixer. In addition to the standard Rex fea-

Specify NATIONAL NC-1 trucks for your large 8-wheel mine cars





Shock-absorbing system of the NC-1 truck is similar to designs of the American Association of Railroads for full-size freight car trucks. The oscillation control mechanism (see cutaway) floats your loads over the tracks.



Track irregularities are no hindrance to higher speeds for mine cars when they are equipped with National NC-1 trucks. Truck design and large diameter, low stressed, load-carrying springs improve riding qualities.



Removal of bolt at each end of side frame permits quick wheel and axle assembly change. Cuts repair time and costs . . . keeps cars in operation longer. No lengthy tie-ups for wheel and axle changes on a National NC-1 truck.



The NC-1 truck stays square automatically. V-shaped slots over the axles make it impossible for the truck to get out of square without lifting entire weight of the car body and lading—means longer service, less repairs.



National NC-1 truck's large center bearing provides maximum wear life by reducing per-square-inch loading . . . provides bolster stability. Has easily replaceable centerplate shims and adequate provision for lubrication.



Side frame and bolster are each of one-piece, integrally cast construction similar to the National C-1 trucks used on railroads. Gives maximum strength, minimum weight—has *no welds or rivets to shake loose.*

A-1009

For minimum maintenance time and spillage, plus maximum equipment protection—specify National NC-1 trucks on your next 8-wheel mine car order.

NATIONAL Products FOR TRANSPORTATION AND INDUSTRY

NATIONAL MALLEABLE and STEEL CASTINGS COMPANY

Cleveland 6, Ohio

WILLISON AUTOMATIC COUPLERS • DRAFT GEARS • NACO STEEL WHEELS



Flood City Bronze Bearings and replacement parts are cast from a superior grade of hard, long-wearing bronze, and are machined by experts for perfect fit.

All standard bronze replacement parts for all types of mining equipment are carried in stock, and we are equipped to make any special bearings to fit your particular needs. Please write for estimates on your requirements.

FOR LOWER MAINTENANCE COSTS AND LONGER SERVICE, SPECIFY FLOOD CITY BRONZE REPLACEMENT PARTS.

Prompt deliveries can be made from complete stocks carried in both Johnstown and Charleston.

FLOOD CITY
BRASS & ELECTRIC CO.
JOHNSTOWN, PA.
BRANCH OFFICE: CHARLESTON, W. VA.

tures, the water tank has been relocated on the top to permit faster water entry, faster batching and more concrete per hour. It is now equipped with a "see-in" clear unbreakable plastic check valve for elimination of guesswork in the water supply.—*Chain Belt Co., Milwaukee 4.*

(18) HOIST BINDER—Safety, convenience and simplicity of operation are stressed in the new Coffing hoist-hinder, said to weigh only 10 lb while exerting a pull of 3,000 lb. Operating on the ratchet-hoist principle, it will take up or slack off a load chain up to a full 20½ in—or more with a longer chain. The unit is easily tightened without releasing the entire load to take a new "grab" and it may be locked in place by removing the handle.—*Coffing Hoist Co., Danville, Ill.*

(19) FOR INCREASED PROTECTION from side blows to its hard-hat wearers' heads, E. D. Bullard Co. now offers sponge-rubber "shock absorbers" that may be attached to hats already in use by pressing the self-adhering strips firmly against the hat crowns under the headband. The practical, inexpensive method permits the individual head-sizing feature of the safety hat to be retained and use of standard headband assemblies, the maker says.—*E. D. Bullard Co., San Francisco 3.*

(20) NEW - TYPE ELECTRICAL TAPE, made with Koroseal material, is said by the manufacturer to have many advantages over ordinary electrical tapes, including a non-transferring adhesive that can be pressed onto a dry surface innumerable times without losing its stickiness and sticks snugly and securely to itself and insulation around copper wire. Extra thin to take up less room, the tape has a dielectric strength of 8,000 v, is waterproof, highly abrasion-resistant, flameproof, resistant to acids, oil alkalis and corrosive salts, it is said.—*B. F. Goodrich Co., Akron, Ohio.*

(21) HAND-OPERATED AIR GRINDER for 8, 6 or 5-in wheels incorporates an added safety device to prevent overspeed operation and possible accidents and offers 20% more power and lighter weight than previous models. With four exhaust positions, operator can readily turn exhaust away from the work and his body. Bulletin 5096 giving full details is available from *Ingersoll-Rand Co., New York 4.*

(22) FOR REPAIRING AND SERVICING safety goggles, two new AO pliers are designed to simplify and speed up the replacing of side-shields on spectacle-type goggles. Called the 169 rivet knockout plier and the 170 riveting plier, they permit inserting or removing goggle rivets without removing lenses in a few seconds, the maker says.—*American Optical Co., Southbridge, Mass.*

(23) FOR LEVEL CONTROL of practically all liquids and solids, Tektor level switch will work with liquids of high or low viscosity and with electrical conducting or insulating properties, but requires no electrical contact with the material under control or use of floats, diaphragms or any moving mechanical parts, the maker says. Model AJ-1 Tektor is connected through a 2-ft length of cable to a sensing electrode which consists of a simple probe, 4 to 6 in long, inserted into the container at the level at which control is required, or, for some applications, flush with the inner surface of the container. Details from *Fielden Instrument Corp., Philadelphia* 33.

(24) A NEW 6-CURVE PLANO PLASTIC LENS for industrial safety goggles, known as Plas-Tough, is made of a newly developed plastic with an improved surface hardness that has unusual resistance to scratches, abrasions and common industrial acids that mar ordinary plastics, with a weight about half that of comparable glass lenses, the maker says. Plas-Tough reportedly is the equal of heat-toughened glass in such qualities as impact resistance and visible light transmission and is available in several shapes.—*Willson Products, Inc., Reading, Pa.*

(25) GRAPHITED OIL-LESS BEARINGS AND BUSHINGS—New line, known as "Gopi," uses only pure graphite, with a specially developed and tenacious binder applied under pressure and baked at high temperature to assure permanence, the maker says. No further lubrication is required during the life of the bearing, which is impregnated to secure complete surface coverage, giving the working effect of a metal saturated with lubricant, it is reported. Details from *Bronze Bearings, Inc., Cranford, N.J.*

(26) CONTRACTORS—Bulletin 4458 Size O AC solenoid contactors are designed for both load and control circuit use in controllers for machine tools, air conditioning and similar equipment. Maximum ratings are 2 hp, 440-550 v, 3 phase 60 cycles. Features include: multi-pole unit construction, double-break silver contacts easily converted to N.O. or N.C. contacts, AC or DC power plants, solenoid-operated and complete accessibility of parts. Literature available from *Ward Leonard Electric Co., Mt. Vernon, N.Y.*

(27) NEW-TYPE NOISELESS AIR VIBRATOR, known as the Type AC (air cushioned), is designed for applications where air vibration is used at close proximity to employees and noise is a major factor. Featuring variation in vibration speed and intensity as desired, Type AC weighs 2 lb, 11 oz, is 6½ in long and 1⅛ in

on the surface . .

in the plant . . . .

underground . . .





REPUBLIC CONVEYOR BELTS MOVE COAL *FASTER...LONGER!*

● Greater tonnage at reduced costs!! That's the story when you use Republic Conveyor Belts.

Republic Belting is the natural choice of both strip and deep mine operators because it keeps moving longer despite the most severe service conditions.

Republic Conveyor Belting is made with tough, resilient rubber covers that resist abrasion and ward off cutting blows from rocks or coal.

Individual plies are evenly impregnated with rubber, then built into a strong, homogeneous structure that will stand up under constant flexing, severe buffeting, impact and other service stresses incidental to mining operations.

Republic Conveyor Belts are supplied to meet your particular specifications in both straight or step-ply construction, with or without breaker strip.

Contact your local Republic Distributor or write direct for further information.



INDUSTRIAL RUBBER PRODUCTS BY

REPUBLIC RUBBER DIVISION

Lee Rubber & Tire Corporation

YOUNGSTOWN, OHIO



Ebensburg Coal Co. installation proves that

Belt reinforced with "Cordura" rayon trains well on long slope conveyor



12,000-pound tension has so little stretching effect on the "Cordura" rayon reinforced belt, above, that the counterweight moves less than one foot when starting with a loaded belt. This belt spans 1234 feet between centers and can carry 250 tons an hour. A 100-horsepower motor and mechanical speed reducer drive the belt 350 feet a minute up a lift of 266 feet. Inspecting the installation is Mr. T. L. Aitken, Vice President in Charge of Operations, Ebensburg Coal Co.

For nearly a quarter mile on a curved and varied course this 36-inch slope belt at the Ebensburg mine, Colver, Pa., trains perfectly. It was manufactured by Hewitt-Robins Inc. on a 5-ply fabric carcass made of Du Pont "Cordura"* High Tenacity Rayon.

Why do belts reinforced with "Cordura" rayon train better? For good reason: The inherent strength of "Cordura" rayon yarn enables manufacturers to make a belt thinner . . . with fewer plies . . . yet stronger. These thin belts are more flexible and sit firmly on the center idler whether loaded or empty, so they train better. They also have less tendency to crack and separate. And the low stretch of "Cordura" rayon saves expensive shutdowns for take-up and resplicing.

Before you order your next conveyor belt, inquire about the advantage of belts reinforced with "Cordura" High Tenacity Rayon. We'll be glad to send you the names of suppliers . . . also complete information about "Cordura" rayon, in a new booklet "Sinews for Industry." For your free copy write: Rayon Division, Room 4421, E. I. du Pont de Nemours & Co. (Inc.), Wilmington 98, Delaware.

*REG. U. S. PAT. OFF.

Du Pont "Cordura" High Tenacity Rayon

STRENGTH AT LOW COST

DU PONT

BETTER THINGS FOR BETTER LIVING

. . . THROUGH CHEMISTRY

wide.—Full application data from *Cleveland Vibrator Co., Cleveland.*

(28) BRONZE BEARINGS AND BUSHINGS in its enlarged and improved line range from small sizes no bigger than a finger tip up to sizes as large as 24 in in diameter, in a variety of types including plain, flanged, split or any combination, the maker reports. Finishes ranging from an accurate machine finish for precision application to a semi-finish for rough work, special lubrication designs as required, and casting from rigidly controlled bearing metals are among the features cited for the line. Full details from *Bronze Bearings, Inc., Cranford, N.J.*

(29) FIRE-ALARM SYSTEMS for use in smaller buildings, truck trailers and homes feature Underwriters' approved thermostats and sell at prices ranging up to $41.85, complete, the maker says. Full data from *Blaze-Master, Inc., New York 17.*

(30) WALKWAY GRATING — New non-skid Grip-Strut grating has a diamond-shaped pattern in which the percentage of open area is in excess of 75% of the total recticulated surface and is made from sheet steel or aluminum ranging from 12 to 16 gage, the maker says. With no welding or peening, the Grip-Strut features high strength, light weight and easy cleaning, it is said.—*Globe Co., Chicago.*

YES—I would like more information . . .

Please send me catalogs or further information about the items from the Equipment News Section whose numbers are circled (September, 1951)

1	6	11	16	21	26	31	36	41	46	51
2	7	12	17	22	27	32	37	42	47	52
3	8	13	18	23	28	33	38	43	48	53
4	9	14	19	24	29	34	39	44	49	54
5	10	15	20	25	30	35	40	45	50	55

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Name (Print) ..... **Position** .....

Company .....

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. . . TO GET MORE INFORMATION on products and bulletins mentioned in this Equipment News Section or for data on any product advertised in this issue. Circle item numbers, tear out and mail.

EQUIPMENT BULLETINS AVAILABLE

(31) NEW "PRODUCTIVE MAINTENANCE" PLAN developed by General Electric Co., Schenectady 5, N.Y., is designed primarily to assist maintenance men in setting-up a program to minimize lost production time and forced idleness resulting from equipment failures. In addition, it is expected to provide better spare parts control and enable users to gain maximum output from existing equipment. As an important part of the help available to maintenance supervisors, the company offers a Productive Maintenance Kit—a file-size package of aids to simplify setting up a working program. It contains an instruction bulletin, a typical balance sheet for keeping historical data on each machine, planned outage forms, and checklists for various equipment.

(32) PROPER STORAGE BATTERY MAINTENANCE is thoroughly discussed and illustrated in the 56-p revised edition of the Gould pocket-size handbook entitled "Instructions and Technical Data for Gould Rubber-Jar Batteries." In addition to a useful new section on battery charging, the handbook contains sections on care and operation, maintenance and repairs, parts, theory of lead-acid batteries and technical data on Gould units. The booklet is offered to all battery users by *Gould-National Batteries, Inc., Trenton 7, N.J.*

(33) FEEDERS AND CONVEYORS —Jeffrey Catalog 830 contains 88 p of comprehensive data on the complete line of Jeffrey-Traylor electric vibrating feeders and conveyors available for a wide range of capacities and applications. Each unit is illustrated and detailed information is provided, including design, application, specifications and dimensions. Operation, installation and control also are covered. Available from *Jeffrey Mfg. Co., Columbus 16, Ohio.*

(34) "COPPER WEIGHTS OF ELECTRICAL WIRES AND CABLES," a new 10-p bulletin issued by the Rome Cable Corp., Rome, N. Y., is designed to assist those who must report their requirements and past usage of wire and cable in terms of copper poundage. Pounds of copper per 1,000 ft are conveniently listed for the most common sizes and types of a wide variety of products.

CARD USERS NOTE—Please be sure to give your name, position and company to insure proper handling of your request. Since some cards have been received without names, we would be glad to have you check us if you have no response to your request within a reasonable time.

(35) "PACKAGED" ELECTRICAL SYSTEMS that help simplify engineering problems, cut equipment and installation costs, conserve vital materials and manpower and insure quicker delivery of electrical equipment is discussed in 24-p Bulletin GEA-5600 released by the General Electric Co., Schenectady 5, N. Y. The booklet explains how packaged power permits rapid plant expansion at low cost through use of standardized electrical components that eliminate the need for individually-engineered assembly of piecemeal components.

(36) EXCAVATING UNITS — 32-p Bulletin 403 covers the entire line of "Marion All-Purpose Excavators," starting with the Type 33-M, a ¾-cu yd standard shovel. Listed are condensed specifications and types of service to which the machines can be converted, such as shovel, dragline, clamshell, crane, backhoe, pile driver or coal loader. Issued by *Marion Power Shovel Co., Marion, Ohio.*

(37) REBUILDING AND HARD-FACING tractor top-carrier rolls by automatic electric welding for lower cost, longer service life and less downtime of the equipment is explained in a new illustrated folder available from the *Stoody Co., Whittier, Calif.*

(38) DIESEL TRACTORS—Fleet applications of International TD-24 diesel crawler tractors operating in earthmoving, mining and other fields are pictorially presented in a folder that also contains a brief listing of the mechanical features of the 148-drawbar-horsepower unit. Form CR-107-A is available from *International Harvester Co., Chicago 1.*

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EQUIPMENT BULLETINS AVAILABLE—Cont'd

USE POSTAGE-FREE CARD ABOVE

(39) VERTICAL TURBINE-TYPE PUMPS—Catalog 7228 from Ingersoll-Rand Co., New York 4, describes the Class APH-APK line of vertical turbine-type pumps said to be particularly applicable to bulk liquid transfer, dewatering and similar services where suction is taken from an open source. Available in single- or multi-stage construction, the units range in size from 6 to 30 in for capacities to 15,000 gpm and pressures to 250 psi.

(40) MINE-LOCOMOTIVE DRIVE—Specification sheet on the Atlas double-reduction spur-gear drive released by the Atlas Car & Mfg. Co., Cleveland, covers in detail the application of the drive in Atlas locomotives for coal mining and other uses. Design features, operating advantages and power savings are thoroughly discussed.

(41) "MINE-LIGHTING DEMONSTRATOR" devised by the General Electric Co., Lamp Dept., Nela Park, Cleveland 12, is a cardboard box with two interior sections which represent simulated mine entries, one dark and the other white as achieved in practice by coating with rock dust or whitewash. Looking through windows in the box indicates how "whitening" of a mine adds the equivalent of 15 times more artificial light and instructions explain how to whiten and illuminate mine interiors.

(42) MINE-LOCOMOTIVE DATA SHEET developed by the Mining and Industrial Electric Locomotive Section of the National Electric Mfg. Association, New York 17, is designed to provide the information necessary to make sure a locomotive manufacturer knows exactly the kind of locomotive the mining company needs, thus minimizing the possibility of misunderstanding. It is divided into two parts: (1) detailed facts on the type of mine and mining plan; and (2) type of locomotive and service required.

(43) FLIGHT AND BELT-TYPE PORTABLE CONVEYORS and undercar unloaders for handling coal, coke and other materials are described in Catalog 512 issued by the Lake Shore Engineering Co., Iron Mountain, Mich. Specification data given cover both electric- and gasoline-powered models and hand-moved and self-propelled conveyors.

(44) LOW-PRESSURE COUPLING is described in Bulletin 514 on the Naylor Low-Pressure Wedge-Lock coupling published by the Naylor Pipe Co., Chicago 19. Designed for connecting lightweight pipe in ventilating and similar low-pressure service, this one-piece positive-type coupling features speed and simplicity of installation, it is stated. Specifications on pipe sizes from 8 to 30 in in diameter are given.

(45) ELECTRIC CAR PULLERS—Catalog 100-H-66 released by American Hoist & Derrick Co., St. Paul 1, describes its complete line of electric car pullers available in three types: capstan, drum and continuous rope. The catalog describes each, with applications and specifications.

(46-47) ROTARY-TYPE AND CENTRIFUGAL SUMP PUMPS—Warren Steam Pump Co., Inc., Warren, Mass., offers separate bulletins containing full application, specification and selection data on these two types of pumps. Circle 46 on the postage-free card for Bulletin WQ-220 covering Types VS and VN centrifugal sump pumps available in wet and dry pit types for handling clear liquids and those containing solids, in sizes from 1¼ to 8 in, with capacities up to 2,000 gpm and heads of 120 ft. For Bulletin WQ-50 on the improved rotary-type Warren-Quimby Rotex pumps, circle 47.

(48) PILLOW BLOCKS—Catalog 88 offers details on the construction, application and installation of Jones Timken-equipped pillow blocks for shafts 1 15/16 to 9 in in diameter. Available from *W. A. Jones Foundry & Machine Co., Chicago 24.*

(49) DRIVE SPEED CONTROL—Publication 1107, a 32-p booklet entitled "Precision Speed Control With the Adjustable-Speed Magnetic Drive," contains complete technical and application information both on the EM Magnetic Drive and the new Magnetic Amplifier Regutron speed control. Available from the Electric Machinery Mfg. Co., Minneapolis 13, Minn.

(50) FLOOR REPAIR AND RESURFACING in three steps with Swift-Floor, over which 50,000-lb loads reportedly can be rolled 60 sec after application, is illustrated and briefly described in Form 120-11 from the *Monroe Co., Inc., Cleveland 6.*

(51) HEAT-RESISTANT PAINTS—Folder L-4261 offers data on five Speco heat-resistant paints said to meet every type of hot-surface need. Available from *Speco, Inc., Cleveland 9.*

(52) PLANT FLOORING—Bulletin 200 on "Plastic Rock" flooring issued by United Laboratories, Inc., Cleveland 12, outlines how and where to apply Plastic Rock, its features and service. Among the typical applications illustrated is the resurfacing of areas subjected to heavy foot and wheel traffic.

(53) THREADED BARS—Bulletin, "Ryerson Threaded Bar Service," offers data on size range, lengths, kind of threads, bending and types and finishes of steel bars furnished threaded, and also illustrates some of the accessories available. Issued by *Joseph T. Ryerson & Son., Inc., Chicago 80.*

(54) DEWATERING UNITS—Bulletin 551 available from the Louisville Drying Machinery Unit, General American Transportation Corp., Chicago 90, provides details on the construction and operation of the Louisville line of dewatering machinery.

(55) INDUSTRIAL FLOOR ENGINEERING—Why installation of industrial floors for maximum life and minimum cost requires experienced planning and execution is discussed in a bulletin released by Flash-Stone Co., Inc., Philadelphia 44. It describes how floors can be engineered to withstand moving and deadweight loads, shock and vibration, extremes of temperature and action of oils, greases, chemicals and industrial wastes.

BUILDS TOUGH ACCESS ROAD *IN 30 MINUTES*



"BIG RED" BLASTS ACCESS ROAD THROUGH THICK WOODS near Bangor, Pennsylvania. At mine this brute power will strip overburden economically.

International's Big Red TD-24 clears 200-foot road to coal mine site in half hour

Slashing and dozing its way through uphill woods, an International TD-24 carved out a 200-foot access road in thirty minutes at the J. H. Beers coal mine near Bangor, Pa.

Now the Big Red Champ is on the stripping job, dozing big loads each pass to a 2½-cubic-yard shovel loading once a minute.

It takes the guts of a "Champ" to dig in and put out the big loads. That's how the TD-24 performs, with 148 maximum horsepower at the drawbar.

Get all the news on this great crawler. Ask your International Industrial Distributor for all the facts, and find out what he offers in service for the years ahead.

INTERNATIONAL HARVESTER COMPANY
CHICAGO 1, ILLINOIS



FAST DOZING DISPLAY—TD-24, with Planet Power hydraulic steering and quick forward-reverse shift, speeds up dozing cycles and makes fast work of road building.

INTERNATIONAL

INTERNATIONAL HARVESTER

POWER THAT PAYS

SUNVIS H.D. 700 KEEPS RINGS FREE

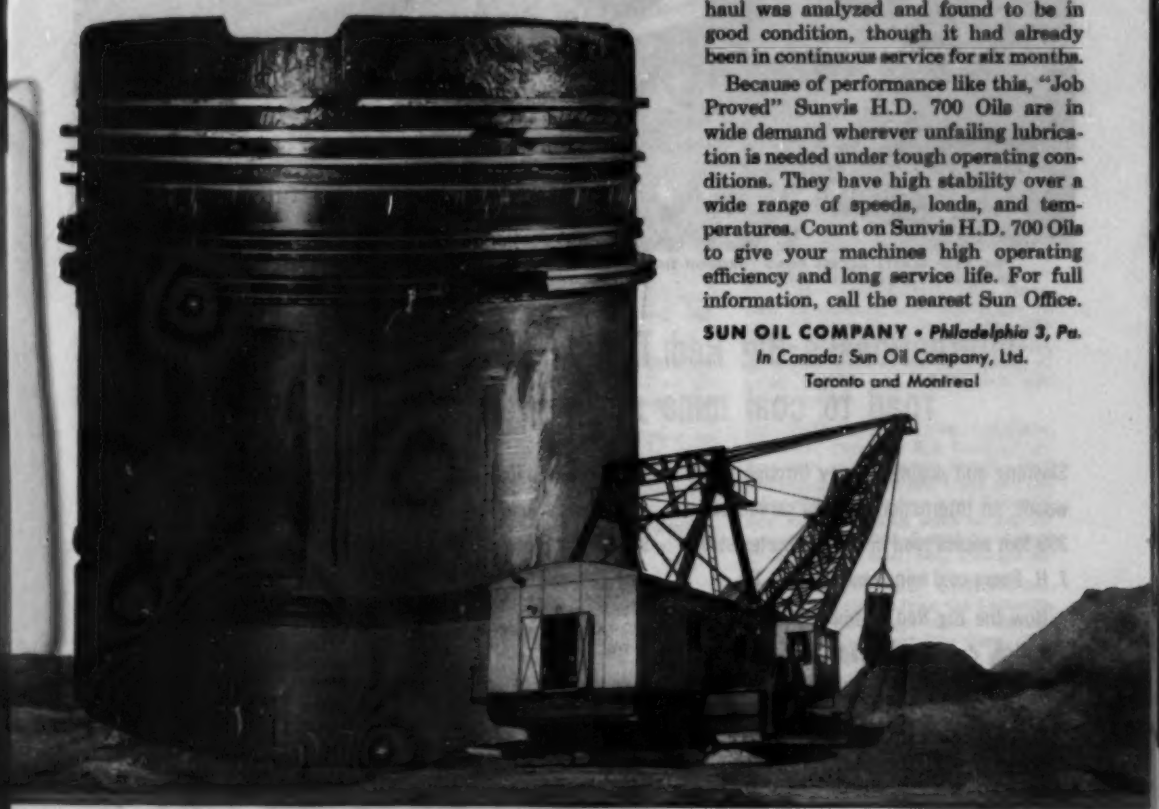
Pistons from Giant Diesel Dragline In Perfect Condition After 13,680 Hours

The piston shown in the unretouched photo below was recently removed from a Cooper-Bessemer 6-cylinder, 4-cycle diesel after a total of 13,680 hours of operation. The dragline shovel it helped power . . . and in which the owners had an investment of $160,000 . . . had been working 24 hours a day removing overburden from coal in strip mining.

The engine, *lubricated from the start by a Sunvis H.D. 700 Oil*, never lost a minute of operating time. The photograph tells why. Thanks to Sunvis H.D. 700 Oil protection, pistons were clean, the oil grooves open, the rings free, the skirts unmarred by seizure or scoring. The entire engine was clean and free of sludge or varnish, the bearings perfect, and not one of the cylinders showed more than 1/1000 inch wear. The charge of Sunvis H.D. 700 Oil in the crankcase at the time of overhaul was analyzed and found to be in good condition, though it had already been in continuous service for six months.

Because of performance like this, "Job Proved" Sunvis H.D. 700 Oils are in wide demand wherever unfailing lubrication is needed under tough operating conditions. They have high stability over a wide range of speeds, loads, and temperatures. Count on Sunvis H.D. 700 Oils to give your machines high operating efficiency and long service life. For full information, call the nearest Sun Office.

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Toronto and Montreal



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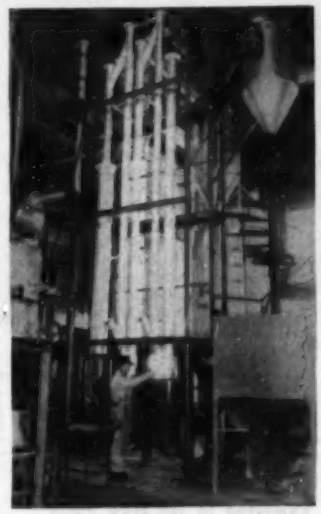
Western Lignite Upgraded To Power Aluminum Smelter

UTILIZATION OF THE WEST'S IMMENSE RESERVES of lignite and other low-rank non-coking coals as a major source of both low-cost electric power and coal-tar products was forecast Aug. 3 as the U. S. Bureau of Mines unveiled a new process capable of producing a high-heat-value char by a variation of low-temperature carbonization.

Immediate application of the process is being planned by the Aluminum Co. of America, according to the announcement several days previously that it would build in Milam County, Texas, a new aluminum smelting plant with an annual capacity of 85,000 tons. The plant will use electricity generated by steam-driven equipment using lignite processed by the Bureau's carbonization method. The generating plant, to be built and operated for ALCOA by the Texas Power & Light Co., will use nearly 7,000 tons of lignite mined in the area daily to produce 3,200 tons of char and 2,300 bbl of tar.

Lignite for the plant will come from the 9,000 acres of land ALCOA is reported to have under lease. Reserves in Milam County are estimated by the Bureau at more than 100 million tons and exploration now in progress is expected to increase the total. It can be extracted both by strip and slope mining at an estimated cost of only $1 to $1.50 a ton, which aids materially in enabling lignite to compete with natural gas for power production, the Bureau reports.

The new carbonization process was developed in the Bureau's laboratories and pilot plants at the Denver Federal Center under a cooperative agreement with Texas Power & Light, J. H. East Jr., regional director of the Bureau, announced.



TWELVE 575-TPD UNITS that will use 7,000 tons of Texas lignite to produce 3,200 tons of high-heat char and 2,300 bbl of tar daily will be patterned after this 25-tpd pilot plant developed by the USBM in Denver.

The Bureau has designed for the Texas Power & Light a 575-tpd lignite-processing unit, which is patterned after its own two pilot plants of 5- and 25-tpd capacities. A battery of twelve 575-tpd units, costing approximately $9,000,000, will be needed to supply fuel for generating the power required by the new ALCOA aluminum smelter.

In the Bureau's process, it was explained, lignite or other low-rank noncoking solid fuel is crushed to ¼-in or smaller. To remove the moisture, the crushed fuel is "boiled" at 350 deg F in a fluidized dryer developed to use the hot products of combustion or flue gas as the heating medium. Then, the hot dry fuel is moved pneumatically to a carbonizing reactor, where it is burned with air at a temperature of 950 F to extract the tar oils and obtain a char. This transformation can be made at an overall thermal efficiency of about 91%, V. F. Parry, project supervisor, believes.

The process also is applicable to synthetic-liquid-fuels production in two ways, Mr. Parry said. First, it yields tar oils that can be readily hydrogenated, using relatively little hydrogen, to produce quality synthetic liquid fuels ranging from heavy industrial fuel oil to aviation gasoline. Second, the carbonizing equipment can be used to extract oil from oil shale fines now discarded because they cannot be handled in most of the pilot-plant shale retorts under study.

Private Plant Proposed For Synthetic Fuels

Some $455 million in federal funds to cover a 12-yr guarantee of 1951 prices to a proposed large-scale plant for the manufacture of synthetic liquid fuels and chemicals from coal will soon be requested of the Defense Production Administration by the Secretary of the Interior, it was reported last month.

Earlier, it was understood that the Wall Street investment firm of F. Eberstadt & Co., through its subsidiary, Colchem Corp., was discussing with the Bureau of Mines the construction of a privately financed coal-hydrogenation plant that would be backed up by fast tax write-offs and a government purchase contract for the output. While the talks were said to be still in the negotiation stage, the proposal was reported to anticipate that the plant would operate on a paying basis through the sale of chemical by-products, which are currently in wide demand. Although details have not been released, one project indicated in a Bureau report would cost $300 million and produce between 15,000 and 30,000 bbl daily, about evenly divided between gasoline and chemicals.

Montana Group Fights Import Of Natural Gas

Representatives of the public, coal operators, mineworkers and railroad unions in Montana have banded together to form the Western State Fuel Policy Council for the specific purpose of contesting the plans of the Montana

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Power Co. for importing natural gas from Alberta, Canada, to Anaconda, Mont.

The new organization, of which D. F. Buckingham, secretary of the Montana Coal Operators' Association, is chairman, grew out of a meeting of some 250 interested persons from seven states held in Billings late in July. Roscoe C. Lotz, Montana state legislative representative for the Brotherhood of Railroad Trainmen, is vice chairman of the group; and R. J. Boyle, secretary-treasurer, UMWA District 27, is secretary.

In a resolution to the FPC asking for a delay in the hearings on Montana Power's application, scheduled for Aug. 20, the group charged that the plan is "merely an opening wedge by which Montana Power Co. and Anaconda Copper Mining Co. can acquire a long-term and unneeded natural gas supply rather than a temporary supply to serve an alleged 'temporary' defense need." It maintained that the importation of natural gas was not necessary to the national defense and pointed to recent government statements on restricting new pipelines.

While the FPC first announced that the hearings would not be delayed, it voted Aug. 6 to hold hearings Sept. 10 in Billings. The resolution, which also has asked that local hearings be held, was prepared by a committee that included B. F. Manley, representing the Utah Coal Operators' Association and other western coal groups; W. A. Romek, Montana Coal Operators' Association; W. A. Boyle, UMWA; and others.

In reporting a $30 million expansion program aimed at bringing its pipeline to the East up to the authorized capacity of 555 million cu ft of natural gas daily, the Transcontinental Gas Pipe Line Corp. announced Aug. 8 that its proposed 27-mi extension into Connecticut to serve the Northeastern Gas Transmission Co. was being postponed indefinitely. Earlier, in July, property owners in Fairfield County, Connecticut, had obtained a temporary court order denying Northeastern's demand for an immediate right-of-way.

While the TVA continues to seek authorization to use natural gas at a new steam plant being erected at Johnson City, Tenn., not far from ample coal reserves, the Louisville (Ky.) Gas & Electric Co. told the Kentucky Public Service Commission July 31 that it was unable to secure enough gas from pipeline companies to assure the City of Louisville against a shortage with a 5-deg mean temperature day. Following the utility's earlier contention that its load in severe winter weather was such that it was unable to adequately serve large industrial customers, the Public Service Commission had, July 12, issued an order prohibiting further conversions of furnaces from other fuels to gas in its marketing area. The utility's latest stand against further conversions came during hearings on protests against the Commission's order.

Coal Pipeline Costs Estimated by Bureau

A pipeline 100 mi long capable of transporting 5,000 tons of coal a day could be built for $10,000,000 and the cost of moving coal that distance would be between $1.28 and $1.91 a ton, the U. S. Bureau of Mines estimated last month in releasing a preliminary study of the method.

With a pipeline of larger capacity, transportation costs would be lower and installation cost, while naturally larger, would not be in proportion to the increased capacity, the Bureau said. For a pipeline of the same length and a capacity of 36,000 tons daily, operating cost would range from 38 to 95c per ton and construction charges would total $25,000,000, it estimated. Some 1½ to 2 million gal of water daily would be required for operation of the 36,000-tpd pipeline.

In its study, the Bureau traces the development of the method, pointing out that because of the technical difficulties it has never been adopted on a large scale although several short lines have been built and operated for handling certain types of coal. The first American patents on pumping coal with water through pipelines were granted in 1895 and 1905, it reported. In an effort to cut coal-transportation costs, the Pittsburgh Consolidation Coal Co. is currently constructing a 12-in 17,000-ft-long experimental pipeline at its Georgetown stripping near St. Clairsville, Ohio.

A free copy of the Bureau's study, RI 4799, "Survey on the Hydraulic Transportation of Coal," may be obtained by writing the Publications Section, USBM, Pittsburgh 13.

ICC Okays New Hike in Rail Freight Rates

The coal industry and other opponents of the railroads' plea for higher rates suffered another set-back in their campaign to keep down the cost of their products when the ICC Aug. 7 authorized an increase in freight rates of 9% in the East and 6% in the rest of the country. The boost, which is expected to add some $548 million yearly to the Nation's freight bill, was opposed by the OPS.

For anthracite and bituminous coal and coke, the increase was limited to 6%, regardless of the territory involved, and subject to a maximum of 20c a net ton and 22c a gross ton. On lignite and lignite briquets, the limit was 3%, for maximum of 10c a net ton and 11c a gross ton.

The new rates replace the temporary increases of 4% in the East and 2% elsewhere granted by the ICC last March. They will expire Feb. 28, 1953, and the ICC reserves the right to review them at any time before then. The railroads had asked for a general permanent increase of 15%.

News In Brief

1952 U. S. Coal Exports Expected to Hit New Peak

U.S. exports of coal, not including shipments to Canada, probably will reach a total of 50 million tons in 1952, James W. Haley, general counsel, Coal Exporters' Association of the United States, Inc., said in testifying before the Senate Finance Committee Aug. 4. The previous peak year was 1947, when 47,758,443 net tons was exported. In his testimony, Mr. Haley estimated exports for the full year of 1951 at 33,700,000 tons, or 132.2% above the average of the four years from 1946 to 1949. Overseas exports in 1950 were only 2,434,389 tons, or 9.6% of the 1946-49 average.

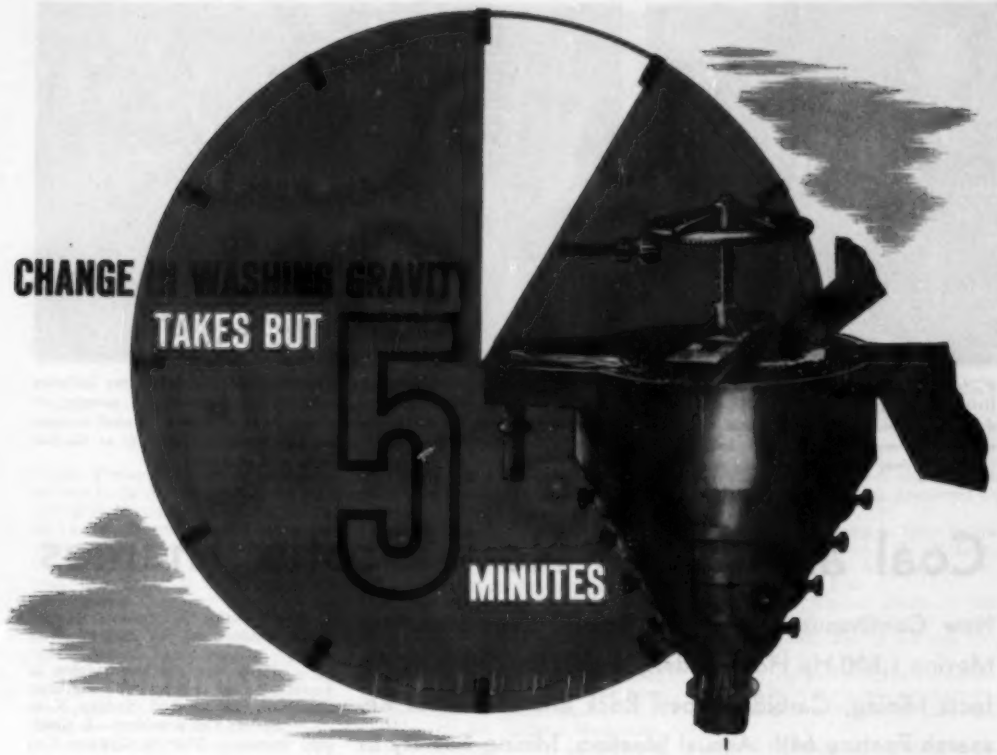
Coal Group to Assist in Ohio River Clean-Up

Representatives of coal-trade associations in the Ohio River watershed met July 31 to form a Coal Industry Advisory Committee to collaborate with the Ohio River Water Sanitation Commission on problems of stream purification faced by the industry. The new coal committee is to consist of the four officers selected, plus two representatives to be appointed from each of the six states represented at the preliminary meeting. Officers of the Advisory Committee are: chairman, E. R. Price, Inland Steel Co.; vice chairmen, R. T. Laing, Central Pennsylvania Coal Producers' Association; and John J. Foster, Island Creek Coal Co.; and secretary, Henry F. Hebley, Pittsburgh Consolidation Coal Co.

Roof-Bolting Legal in Pa. If Approved by Mines Dept.

Responding to a request of the Pennsylvania Department of Mines for an opinion on the legality of roof-bolting under the mine laws, the Pennsylvania Attorney General has ruled that it is permissible in underground bituminous mines if permission is first obtained from the Secretary of Mines and roof bolts are installed in accordance with special rules and regulations set up by the Secretary. Roof-bolting should be regarded "as prima facie unsafe" until and unless these conditions are fulfilled, the ruling stated. "Indeed, we are of the opinion that ordinary prudence on the part of the operator, superintendent or mine foreman, apart from the letter of the law, as we have interpreted it, would demand such a course . . .," it said.

More News Briefs on p. 148



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WITH A BACKGROUND OF OVER SIXTY YEARS' EXPERIENCE



NOVA SCOTIA OFFICERS—Donald J. MacNeil (left), St. Francis Xavier University, new president; S. C. Mifflen, Dominion Coal Co., Ltd., elected secretary for his 24th term; and John H. Fraser, Sydney steel plant, retiring president.



SAFETY AWARD—James Guest, manager industrial relations, Old Sydney Collieries, Ltd.; R. M. McColl, Mine Safety Appliances Co.; L. J. MacDonald, manager, receiving M-S-A trophy for Princess colliery from David G. Burchell, general manager, Bras d'Or Coal Co.; R. R. Dickson, colliery superintendent; and H. C. M. Gordon, general manager, Dosco coal properties.

Coal and Steel Nova Scotia Themes

New Continuous Miner for Longwall, Rope-Socketing, Moving 1,800-Hp Hoist Underground, How Geology Affects Mining, Carbide-Tipped Rock Bits and Steel Research Feature 64th Annual Meeting, Mining Society of Nova Scotia

NEW DEVELOPMENTS in the steel and mining industries of Nova Scotia was the theme of the 64th annual meeting of the Mining Society of Nova Scotia, held at the Isle Royale Hotel, Sydney, N. S., July 12-13, with inspection trips to nearby points of interest July 14. New officers were inducted at the meeting as follows:

President—Donald J. MacNeil, professor of geology, St. Francis Xavier University, Sydney, N. S., and visiting professor, Massachusetts Institute of Technology. Mr. MacNeil succeeded John H. Fraser, general superintendent of the Sydney Steel plant.

First vice president—John A. Russell, chief mechanical engineer, Dominion Coal Co. Ltd., Sydney, N. S.

Second vice president—R. Charlick, manager, Victoria Gypsum Co., Ltd.

Secretary—Sydney C. Mifflen, technical assistant to the general manager, Dominion Coal Co., Ltd., Sydney, N. S. (re-elected to his 24th term).

Elected members of council for the society were:

C. M. Anson, general manager, Dominion Iron & Steel Corp., Ltd.

David G. Burchell, general manager, Bras d'Or Coal Co.

Frank Doxey, assistant general manager, Dominion Coal Co., Ltd.

A. E. Flynn, professor of mining, Nova Scotia Technical College.

Louis Frost, chief mining engineer, Dominion Coal Co., Ltd.

H. C. M. Gordon, general manager, Dominion Coal Co., Ltd.

Karl E. Gustafson, assistant mining engineer, Dominion Coal Co., Ltd.

Harry Hines, assistant general superintendent, Dominion Coal Co., Ltd.

R. M. McColl, Mine Safety Appliances Co.

Angus McDonald, manager, No. 20 colliery, Dominion Coal Co., Ltd.

S. Gordon Naish, Joy Mfg. Co.

R. P. Nicholson, assistant general manager, Acadia Coal Co., Ltd.

Earl B. Paul, assistant general superintendent, Dominion Coal Co., Ltd.

William S. Wilson, chief engineer, Dominion Steel & Coal Corp., Ltd.

Opening the technical sessions July



MINING AND STEEL—Dr. N. A. Parlee (left) Dominion Iron & Steel, and M. G. Goudge, Nova Scotia Department of Mines.



GEOLOGY AND MINING—Dr. T. B. Haites (left), and Dr. L. J. Weeks, Geological Survey of Canada, presiding.



MINING, ROPE SOCKETING—Frank Dezey (left) and J. A. Russell, Dominion Coal Co., Ltd.



HOIST MOVING, ROCK BITS—D. McFadgen (left), A. McDonald and S. McLean, Dominion Coal Co., Ltd.; J. C. Heaslip, Canadian Ingersoll-Rand.

12, Mr. Fraser devoted his presidential address to the development of the steel and coal industries of Nova Scotia, with particular emphasis on the operations of the Dominion Steel & Coal Corp., which had its beginning in coal. In fact, said Mr. Fraser, the first systematic mining of coal on the North American Continent was in Nova Scotia—by the French at Port Marien, about 18 mi east of Sydney, in 1720. For many years development was in the hands, first, of a chartered monopoly and then a number of individual companies, with duplicate facilities and strongly in competition. This led to attempts at consolidation and unification, culminating in 1929 in the formation of Dominion Steel & Coal, the four constituent companies of which now mine over 90% of the Province's coal output.

The steel operations of the corporation had their beginnings in Nova Scotia also. The first steel ingot was cast in Trenton in 1884, and growth and consolidation eventually culminated in the organization of the Dominion Steel & Coal Corp. in 1928, operating both basic steel producing and fabricating and manufacturing facilities.

"The technique of producing coal under peculiarly adverse conditions," Mr. Fraser pointed out, "has been developed in Nova Scotia to a point where it is not outclassed by practices in any other field. The same is true of steel making at Sydney, where the raw materials—ore and coal—are of such a composition as to be difficult to handle. Challenging to men's ingenuity these problems have been, but men were found on the spot to meet the challenge and solve the problems.

"With a management of outstanding caliber, a technical staff of highly trained and experienced personnel, and an operating force of many thousands of employees determined to cooperate in the application of their efforts, the coal and steel industries of Nova Scotia, under the direction of the Dominion Steel & Coal Corp., have been brought to a high degree of efficiency and hold attractive prospects for the future."

Coal and Steel Reports

In reporting on the mining industry of Nova Scotia in 1950, M. G. Goudge, mining engineer, Nova Scotia Department of Mines, pointed out that the value of the output again reached a new high of 60 million dollars, $1 million more than the preceding year. Of the total, coal output was valued at slightly over $50 million. Mechanization of face operations, he reported, is on the upswing and relations between management and labor have improved, with consequent increase in tons per man.

A long list of recent developments at the Sydney steel plant of Dominion Iron & Steel, Ltd., were briefed by Dr. Norman A. Parlee, assistant director of metallurgy and research. Included is a study of coal beneficiation through washing, and investigation of ways and means for improving coke by blending and sulphur reduction, in addition to removal of ash from the coal. In addition, recovery of by-products has been initiated and is still being pressed.

With Mr. Gordon presiding, the luncheon meeting July 12 featured an address by Lionel A. Forsyth, president, Dominion Iron & Steel Corp., Ltd., and awards to students and mining men achieving top grades in examinations for certification. Noting that coal mining in Nova Scotia offers problems found nowhere else, Mr. Forsyth pointed out the importance of mechanization and declared that his organization feels the industry is on the threshold of a new era in mining and distribution of coal. He emphasized the importance of bringing young men into the industry, and urged that they seek the training that would fit them for managerial posts. Dosco, he declared, welcomes all such young men.

With Messrs. Gordon and Forsyth officiating, awards were presented as follows:

Institute scholarship to Nova Scotia Technical College—A. R. McLean, mining engineering department, Dominion Coal Co., Ltd.

Award for highest grade in the mine-managers' examination—Leslie Lewis, overman, No. 18 colliery, Dominion Coal Co., Ltd.

Award, under-managers' examination—Joe E. Whalen, mining engineering department, Dominion Coal Co., Ltd.

Award, overmen's examination—Adrian McNeil, No. 7 mine, Old Sydney Collieries, Ltd.

Award, highest grade, Rupert McNeil, Acadia University.

Award, highest grade, Randall Cormier, St. Francis Xavier University.

Rope Socketing

Investigation leading to the standardization of rope-socketing methods were detailed by Mr. Russell to start the second technical session, with N. T. Avard, president, Joggins Coal Co., Ltd., presiding. The goal in the socketing investigation, Mr. Russell stated, was a uniform method that also would be the best and would permit easy checking on practice and results.

A committee formed for the investigation soon came to the conclusion that there were two major possibilities: (1) the Dominion Coal Co. method of bending the wires back over a serving, cutting them to various lengths and serving them overall to make a conical terminal, pulling this terminal into the socket and pouring in babbitt; and (2) British Standard Specification No. 463, involving opening the rope, fanning the wires out, cleaning them with a solvent, drawing them into the socket and pouring with babbitt or white metal.

The two types of sockets were

(Continued on p 168)



PREPARATION-PLANT POWER—J. G. Price (left), electrical engineer, Ayrshire mine, Ayrshire Collieries Corp; L. Guy Shorthouse, general superintendent, United Electric Coal Cos.; George J. Reynolds, preparation and electrical engineer, Morgan Mines, Inc.; and R. L. Pate, McNally Pittsburg Mfg. Corp.



ELECTRICAL PROTECTION, COMMUNICATION AND UTILIZATION—A. M. Opsahl (left), Switchgear Distribution Apparatus Engineering, Westinghouse Electric Corp.; V. S. Anderson, Motorola, Inc.; R. B. Moore, General Electric Co.; and John J. Huey, electrical engineer, United Electric Coal Cos.

Open-Pit Electrical Group Meets

NEW ELECTRICAL ADVANCES for stripping operations and strip-mine communications held the interest of 121 open-pit electrical engineers and manufacturers' representatives from 27 states who registered at the 7th annual meeting of the Electrical Division, Open-Pit Mining Association, at Urbana, Ill., July 27. Though coal men were in the majority, the meeting drew electrical men from quarries, ore mines and gravel pits also. Outstanding feature of the sessions was the unveiling of a listing of major spare parts for electric shovels. The listing represents completion of a mutual-aid project undertaken by the association more than a year ago.

New officers were elected at the banquet Friday evening as follows: president, George Reynolds, preparation engineer, Morgan Mines, Inc., Herrin, Ill., succeeding J. G. Price, chief electrician, Ayrshire mine, Ayrshire Collieries Corp., Oakland City, Ind.; vice president, Charles Crawford, electrical engineer, Midland Electric Coal Co., Farmington, Ill.; and secretary-treasurer, L. E. Briscoe, electrical engineer, Fairview Collieries Corp., Indianapolis, Ind.

Mr. Price presided throughout both sessions of the meeting, with L. Guy Shorthouse, general superintendent and secretary, United Electric Coal Cos., Chicago, serving as master of ceremonies.

Mechanized handling of raw bulk materials has created the high standard of living in the United States, said Dr. W. H. Voskuil, professor of Mineral Economics, University of Illinois, who, along with W. L. Everitt, dean, College of Engineering, welcomed the association of the university campus. Depletion of our nation's high-grade fuels and ores will demand more and better machines, more power and more human skills, Dr. Voskuil predicted.



ASSOCIATION OFFICERS—George J. Reynolds (left), new association president; L. E. Briscoe, re-elected secretary-treasurer and electrical engineer, Fairview Collieries Corp.; Charles Crawford, new association vice president and electrical engineer, Midland Electric Coal Co.; and J. G. Price, retiring president.

Preparation-Plant Layouts

To speed preparation-plant building and to do it economically, the plant designer or mechanical engineer must understand the electrical layout from the start, especially the number of control centers, said R. L. Pate, McNally Pittsburg Mfg. Corp., whose paper led off at the morning session. Recently, his company has moved toward standardization of electrical layouts for preparation plants with the aim of keeping coal operators and electrical engineers abreast of the latest advances in electrical controls and helping design and sales engineers, as well as cost-estimating departments, perform their jobs efficiently, Mr. Pate reported.

The tendency in modern prepartion-plant design is to use more electrical circuits—that is, more transformer banks of smaller size. Standardizing the design layout shows where air circuit breakers may be quickly used and where they must be supplemented

(*Continued on p 174*)

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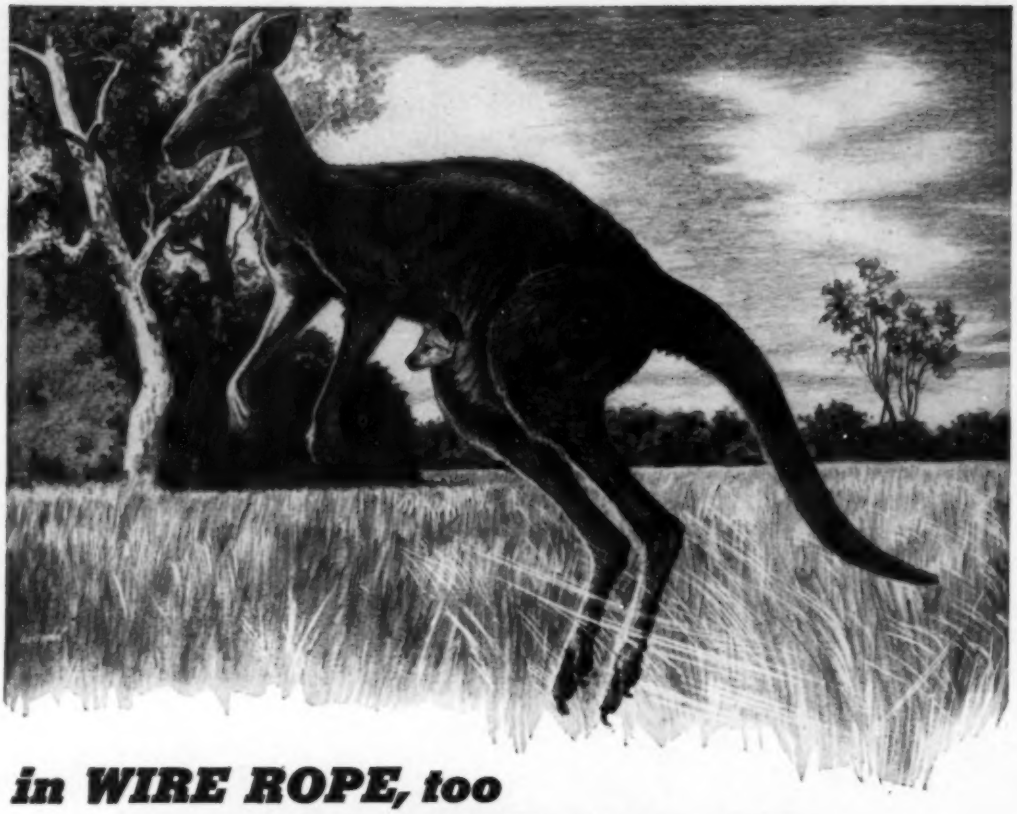


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Briquetters View Industry Progress

Briquet Production Practices and Marketing Problems in the U. S., Canada and Abroad Discussed at 2d Biennial Coal-Briquetting Conference, Superior, Wis., With Lignite Utilization an Added Starter

WITH 13 FORMAL PAPERS and accompanying discussion, the problems and progress of the coal-briquetting industry here and abroad were thoroughly aired at the 2d biennial coal-briquetting conference at the Hotel Androy, Superior, Wis., Aug. 2-3, under the auspices of briquetting manufacturers, materials suppliers and the Natural Resources Research Institute of the University of Wyoming, which staged the first conference in Laramie, Wyo., in 1949. The program also included discussion of the gasification of lignite and its use in the reduction of sponge iron. Chairman of the program committee was Neal Rice, coal research chemist for the research institute.

INDUSTRY MEETING
—A Special Coal Age Staff-Written Report

The Market Situation

A more favorable outlook for the solid-fuels industry was noted by Ivan A. Given, editor of *Coal Age*, who opened the conference, with H. C. Richter, general manager, Stott Briquet Co., Superior, and chairman of the arrangements committee, presiding. Rising prices of oil and natural gas, and fears of service interruptions and rationing, Mr. Given stated, are among the factors generating increased interest in solid fuels and indicating an increased market for all types, including briquets.

Noting that the resurgence of oil and natural-gas competition since the war had been reflected in a reduction in briquet sales and production, and forecasting a further drop, L. C. Krchma, development engineer, Asphalt Dept., Socony-Vacuum Oil Co., Kansas City, Mo., led an informal symposium on marketing problems and prospects for briquets. This brought out that LP gas is becoming an increasingly competitive factor in rural areas, while rural electrification is making it possible for the user to burn a wider range of fuels.

Introduction of natural gas into the larger communities also has hurt briquet sales, along with strikes in the coal industry, which have disgusted the public and raised prices. At the moment, also, slow movement of materials out of yards handling lumber and cement in certain areas is keeping these dealers from buying both because of lack of storage space and a shortage of cash. Greater prosperity, it also was brought out, favors higher-cost competitive fuels, and home buyers and renters are partial to the automatic-heat argument, which normally means gas or oil.

A substantial future for the briquet is still expected, however, particularly since it can compete well against natural coal. Heat regulators, it was pointed out, have saved a lot of solid fuel business.

Briquetting Abroad

Reviewing the coal-briquetting industry of western Canada, J. G. Miller, chemical engineer, Husky Oil & Refining Co., Ltd., Edmonton, Alta., pointed out that it got its start as a means of solving the fines problem, which grew out of railroad refusal to accept them in engine fuel. With few other outlets, briquetting was about the only answer. Production in 1939 was 73,020 tons; in the peak year of 1949, 506,964 tons; in 1950, 452,191 tons.

For success in briquetting, Mr. Miller concluded, the following are essential: (1) slack uniform in size, moisture and ash; (2) a foamer for the asphalt to assist in mixing and fluxing; (3) guarding against over-kneading in fluxing; (4) care in cooling and storage and refraining from shipping until maximum quality conditions are reached.

Addition of wetting agents and effect of moisture were initial topics in

(Continued on p 182)

COAL MEN ON THE JOB



VISITORS VIEW TESTS OF AUGER MINING UNDERGROUND at Consolidation Coal Co. (Ky.), Div. of Pittsburgh Consolidation Coal Co., near Myra, Pike County, Ky. (see p 74 of this issue): L. M. Walters and T. C. Hamill, Sycamore Coal Co.; L. A. Newman, Henry Bertram and Bert Keener, Jones & Laughlin; D. E. Griffith and E. B. Cross, Pruden Coal & Coke Co.; J. B. Herring and J. W. Rudnicki, Chesapeake & Ohio Ry.; W. A. Haley and J. J. Shields, USBM; J. T. Parker, L. E. Porter, K. B. Dane, W. F. Hughes and Ralph Banks, Inland Steel Co.; Frank Howard, auger operator; and John K. Berry, author of the article describing tests of the unit.



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THE MOLVEYOR, a series of belt conveyors which work in a train and take the coal in a continuous stream from the COLMOL. Intermediate transportation is NOW assured . . . the continuous mining chain is complete with these companion machines. Investigate.



Jeffrey MM76-A COLMOL (low type) in various heights from 32″ up to 54″. Below—Jeffrey MM76-B COLMOL (high type) from 45½″ to 72″.



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Personal Notes



New Hanna Superintendent

EVAN ADAMS has been appointed superintendent of Piney Fork No. 1 mine, Piney Fork, Ohio, James Reilly, vice president of the Hanna Coal Co., Div. of Pittsburgh Consolidation Coal Co., announced last month. A veteran of 27 yr in coal mining, Mr. Adams succeeds Norman C. Prudent, resigned to become superintendent of a potash mine of the Southwest Potash Corp., near Carlsbad, N. M. A graduate of the Coyne Electrical School and Chicago Technical School, Mr. Adams joined the Hanna organization in 1942 as a maintenance foreman. A year later he became master mechanic at Piney Fork and was appointed assistant superintendent in 1950.

Herbert E. Jones Jr. has been named vice president in charge of operations of the Amherst Coal Co., Logan County Coal Corp. and the Hatfield-Campbell Creek Coal Co., with offices at Lundale, W. Va. He succeeds the late William W. Beddow.

Davis Read, who has been actively engaged in the consulting field for the past year, with offices in Madisonville, Ky., has announced the opening of an office in Chicago at 120 S. LaSalle St. On Aug. 1, 1950, Mr. Read terminated a long period of service with the West Kentucky Coal Co., as chief engineer in charge of mining operations to enter the field of consulting engineering. For 10 yr previously he had been active in the modernization of the company's underground production and preparation facilities Mr. Read will continue his consulting service in Kentucky as well as in Illinois and other fields.

Edward B. Taylor, since 1947 superintendent of the Maitland mine, Coal Div., Eastern Gas & Fuel Associates, has been named assistant chief engineer at the company's Pittsburgh office. John P. Schwartz, general mine foreman at Maitland since 1947, has been appointed superintendent to succeed Mr. Taylor. Replacing Mr. Schwartz as general mine foreman, is **Dorsey L. Bowling**, formerly night foreman. **Harvey H. Richardson**, section foreman, has been promoted to night foreman at Maitland.

William L. Black, with EG&FA for more than 22 yr, has transferred from assistant general foreman at Powellton No. 6 to general foreman, Powellton No. 3-Eagle mine. **Earl Adkins**, formerly section foreman at No. 2 Gas mine of Powellton No. 6, has been transferred to Powellton No. 3. **Ulvert Elkins**, formerly cutting-machine helper, has been promoted to section foreman at Kopperston No. 2 mine.

H. D. Pinkney, for the past 3 yr superintendent of CF&I's Morley and Frederick mines, last month was named superintendent of the company's new Charles Allen mine now under development near Trinidad, Colo., according to an announcement by G. H. Rupp, manager of the mining department. **L. W. Ingles**, formerly superintendent of the Kebler and Pictou mines, was appointed superintendent at Morley and Frederick, to succeed Mr. Pinkney. Replacing Mr. Ingles at Gebler and Pictou mines was **Anthony Pagnotta**, mine foreman at Kebler for the past 5 yr.

Dwight Beard, employed at the Majestic colliery of the Peabody Coal Co. for the past 20 yr, has been promoted from night-shift foreman to night mine manager, succeeding **Walter Schickedanz**, resigned.

Several changes of operating personnel at Inland Steel Co. mines have been announced by E. R. Price, manager of coal properties, effective Aug. 1. **Howard Holbrook**, mine foreman at Price mine, has been transferred to Wheelwright mines as mine foreman of the North Main section of Mine No. 3. **J. T. Anglain**, mine foreman, Wheelwright Mine No. 3, will have charge of the No. 3 Mains section and also the Northwest Main section. **W. A. Pack**, assistant mine foreman, Wheelwright, has been appointed mine foreman on the third shift at the Wheelwright mines, in charge of all underground work on that shift. **Victor Greer**, assistant mine foreman at Price, has been transferred to the Wheelwright mines as assistant mine foreman in charge of all first-shift general underground labor. All four men report to W. F. Hughes, general mine foreman at Wheelwright. **Ralph Banks**, production engineer, has been made mine foreman at Price mine, replacing Mr. Holbrook, and reports to Leon Porter, general mine foreman at Price.

John N. Crichton has been named to the newly created position of general manager of mines for the Johnstown Coal & Coke Corp., A. B. Crichton, Jr., vice president in charge of operations, recently announced. General superintendent of Pennsylvania mines since 1948, Mr. Crichton will be in charge of all seven of the company's operations in his new post. **John J. Resick**, superintendent of the company's Portage, Pa., mines for the last 2 yr, has been named general superintendent of Pennsylvania mines, to succeed Mr. Crichton.

S. D. Michaelson, formerly chief engineer of coal mines for the Tennessee Coal, Iron & R.R. Co., Birmingham, Ala., has been promoted to the post of chief engineer for raw materials for the U. S. Steel subsidiary.



P&R Honors 70-Yr Work Record

NICHOLAS F. HOFFMAN (left) is shown with George A. Roos, vice president, Philadelphia & Reading Coal & Iron Co., after presentation of an Employee Service pin marking his 70 yr of service with the company. Mr. Hoffman also holds the Joseph A. Holmes Safety Association Certificate of Achievement which he received for working 70 yr in anthracite mining without an accident. The awards were made at the company's annual first-aid meet, at which Mr. Hoffman was guest of honor. Now nearing 81, Mr. Hoffman was master mechanic at the P&R Mahonoy City colliery on his retirement last March.

Obituaries

Ellsworth H. Shriver, 60, vice president and general manager, Raleigh Coal & Coke Co., Beckley, W. Va., died Aug. 12. Mr. Shriver joined the company in 1934 as general superintendent and was advanced from assistant general manager to vice president and general manager at the end of 1948.

Paul Sterling, planning engineer for the Lehigh Valley Coal Co., Wilkes-Barre, Pa., died Aug. 13 at his home after an extended illness. He joined Lehigh Valley in 1900 after graduation from Yale and was widely known throughout the industry for his work on anthracite preparation. Mr. Sterling had supervised the design of some

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DENSIFIERS	HMS LABORATORY UNITS	SAND PUMPS
CONE SEPARATORS		CONDITIONERS
DRUM SEPARATORS		

of the most modern breakers in the region and was the author of various technical articles and textbooks on the subject. He also was a director of the Morris Run Coal Co. and served as hydraulic engineer for the Wyoming Valley Water Supply Co., Hazleton.

Prof. A. Copeland Callen, 63, head of the mining engineering deparment of Lehigh University, died July 30 at his summer home in Ocean City, N. J. Widely known throughout the industry, Prof. Callen formerly was head of the department of mining and metallurgical engineering at the University of Illinois and professor of mining engineering and director of mining extension at West Virginia University. For some years he had directed the annual anthracite conference held at Lehigh University and was a past president of both the Illinois and West Virginia mining institutes. He also has been active in the Kiwanis organization for many years and served as president of Kiwanis International in 1936-37.

Ernest Butterman, 58, president of the Cedar Valley Coal Co., and vice president of the Lone Star Coal Co., Terre Haute, Ind., died during July.

John Green Sr., 62, co-owner of the Mine Service Co., Hazard, Ky., was killed July 11 when his car in which he was alone went over a bank near Coeburn, Va.

William C. Johnson, 49, executive vice president of the Allis-Chalmers Mfg. Co., died unexpectedly July 26 following a heart attack. Mr. Johnson, who had become executive vice president just last February, joined Allis-Chalmers in 1924 as a machinist's helper.



Pioneer City Coal Co. Team Wins Anthracite Contest

COMPETING against 11 other teams in the 9th Annual First-Aid Contest of the Northern Anthracite Independent Operators' Association, this team representing the Pioneer City Coal Co., Carbondale, Pa., won top honors with a score of 99.93%, at Russell Park, Carbondale, July 14. Members of the winning team are: Frank Germano (left), Leo Roman, Leo Lawler, Bernard Heanan (captain), Angelo Giombatti (president of the company), Charles Ellis, Henry Prince and George Yoke. Other teams placing were: John Booth, Inc., Pompey Coal Co., Timothy Burke, Inc., and Gillen Coal Co. The winning team was awarded a plaque and cup, and each member received $25 and a cup.

More News of Pa. and W. Va. Safety Meets Starts on p 156

Defense Developments

Federal Order Limits Natural-Gas Sales

Limitation of the extension of natural gas to new customers, under consideration for almost 2 mo, was finally ordered by the Petroleum Administration for Defense Aug. 15, effective Aug. 22. Actually, the order calls for a "slowdown" in adding new gas customers in 15 states and the District of Columbia and is a considerable "modification" of the original regulation first drafted late in June which would have cut off natural gas from any new home-heating or industrial users.

Purpose of the order is to prevent further natural-gas expansion during the current shortage of steel available for the construction of pipelines. Various government officials already have predicted possible shortages during the coming winter, with closing of defense plants a distinct possibility during periods of severe weather. Announcement of the proposed original order brought immediate protests from the gas industry, and the PAD's problem was further complicated by a section of the economic controls bill passed at the end of July permitting the individual states to assume responsibility for seeing that defense industries get the gas they need. Prior to issuing the order, PAD officials had conferences with industry officials and also held a meeting Aug. 9 with public service commissioners of 15 states to discuss application of the proposed limitations. Reports indicated that at least several states would exercise the authority given them under the defense bill to take over regulation of new customers. Should these states compete among themselves for the supplies of gas available, the PAD order would be ineffective in delaying gas expansion, it was pointed out.

NPA Puts Full Controls on Steel, Copper and Aluminum

The government's Controlled Materials Plan is to be extended Oct. 1 to all manufacturers using steel, copper or aluminum, NPA formally announced last month. The move, which had been anticipated for some time, will permit manufacturers of consumer durable goods to obtain firm allotments of the three metals for the last quarter.

NEWS OF YOUR ORGANIZATION is also interesting to others, so why not tell COAL AGE of personnel changes among your staff members, mine development plans and newsworthy company activities.

Fourth-quarter allocations for defense and defense-supporting industries under CMP, announced by DPA July 27, included the following for coal-mine and coke-oven construction and machinery: coal mines—steel, 25,615 tons; copper, 215,000 lb; aluminum, 31,000 lb; coke ovens—steel, 18,135 tons; copper, 535,000 lb; aluminum, 70,000 lb. All the steel and aluminum requested for coal mining and coke ovens was allowed by DPA, but the requested allotment of copper was reduced by 35,000 lb.

Coal-Mine Priority Order

A new self-rating priority system for coal mines and treatment plants is to be set up soon by the NPA, it was reported last month. The order, which probably will be similar to that issued Aug. 1 for metal and nonmetallic mining, is expected to provide a method by which coal producers can obtain maintenance, repair and operating supplies and minor capital additions, as well as detailing the procedure for obtaining major capital additions.

DSFA Appointments Made

Among the three appointments to the Defense Solid Fuels Administration recently announced by Secretary of the Interior Chapman was that of Lee M. Morris, Charleston, W. Va., as director of the DSFA manpower division. Before opening an office as a consulting engineer in Charleston 2 yr ago, Mr. Morris served as assistant to the president of Warner Collieries Co.,

and also was professor of mining at the West Virginia Institute of Technology. Named as technical advisers in the DSFA equipment and materials division were Fred R. Toothman, Huntington, W. Va., and William B. Young, Alexandria, Va. Mr. Toothman since 1946 has been a mining engineer with the C&O, and Mr. Young was a mechanical foreman for EG&FA, supervising installation of mining equipment from 1946 to 1948.

Association Activities



W. J. PARTON, general manager, Lehigh Navigation Coal Co., was elected president of the Anthracite Chapter, Pennsylvania Society of Professional Engineers, at the annual meeting held in Pottsville. Other officers named include: vice president, Thomas J. Lewis, Anthony G. Reese and Charles M. Robb; secretary, David B. Baird; treasurer, Harold L. Burmeister; and state director, Robert F. Miller. Elected members of the board of directors were: A. J. Berger, C. S. Kuebler, Garfield A. Schnee, Paul A. White, Harry W. Jones, Carl Collier, Paul T. Lamont and W. Joseph Nagle.

R. E. Salvati, president of the Island Creek Coal Co., has been elected a Class "A" member of the board of directors of Bituminous Coal Research, Inc., by the National Coal Association. Mr. Salvati succeeds H. A. Glover as a member of the BCR board. L. C. Campbell, vice president, Coal Div., EG&FA, has been elected a Class "B" member of the BCR board, succeeding P. B. C. Smith, it was also announced last month.

Charles R. Griffith, president, Southern Coal & Coke Co., Knoxville, has been appointed chairman of the marketing committee of the National Coal Association. A member of the committee for some time, Mr. Griffith succeeds H. A. Glover of the Island Creek Coal Co., retired.

New Mine Developments

The Rochester & Pittsburgh Coal Co. is planning the construction of coke ovens and other facilities at its Lucerne mines in Indiana County, Pennsylvania, designed for a capacity of 200,000 tons of coke annually. The plant will be completed in about a year, according to Dr. C. J. Potter, R&P president, who also is president of Lucerne Coke Co., which will build and operate the coke facilities. A $2,200,000 loan for the project has been approved by the Defense Production Administration. Rochester & Pittsburgh also has opened a new deep mine on the B&O near McIntyre, Pa., known as Kent No. 8.

Formation of the Hazard & Southeastern R.R. Co. to construct a 2¼-mi spur in Letcher County, Kentucky, to connect the Younts Fork branch of the L&N with the Beaver Creek branch of the C&O was announced Aug. 14 by the Hazard Coal Operators' Association. ICC authority for the project will be sought as soon as a survey to determine the exact route is completed and the line will be constructed within the next few months, William B. Sturgill, executive secretary of the association, reported. The spur is expected to open up large areas of undeveloped coal land and will serve a number of mines now relying on truck transportation, it was said. Incorporators of the new railroad company, capitalized at $1,000,000, include: Dr. Huston F. St. Clair, president, Jewell Ridge Coal Corp.; Peyton L. Mitchell, general manager, Knott Coal Corp.; F. M. Medaris, general manager, Harvey Coal Corp.; W. E. Davis, president, Old King Mining Co.; L. A. Hopper, vice president, Columbus Mining Co.; G. P. Fritz, president, Ajax Coal Co.; Roger F. Cooper, president, Kentucky River Coal Corp.; M. K. Eblin, president, Eblin Coal Co.; and Mr. Sturgill.

The Meadow Creek Coal Co., Monterey, Tenn., has been awarded a contract by the Tennessee Valley Authority to supply 1,500,000 tons of coal to the Kingston and Watts Bar steam plants, it was reported Aug. 18. Deliveries are to be made over a 5½-yr period by both railway and truck. Value of the contract was estimated at $6,300,000.

The Hazelkirk mine of the Daugherty Coal Co., operated by the Horne Coal Co. under a lease agreement, has been sold to the U. S. Steel Co.

The Southern Coal Co., Inc., Chicago, has announced the opening of its new Broken Aro mine near Wellston, Ohio. Designed as a large-scale fully modern operation, the mine will ship washed coal under the Broken Aro trade name via the B&O. Preparation facilities include specific-gravity washers, sizing and blending equipment.

The Union Colliery Co. reportedly has been acquiring options on the necessary acreage for development of a new 5,000-tpd slope mine near Shawneetown, Ill. A completely mechanized operation, the new mine would be approximately the same size as the New Kathleen mine at DuQuoin, which cost $2,500,000 and employs 350 men, it was reported. Facilities would include barge loading on the Ohio River for transport of coal to the new power plant being built at Joppa to serve the AEC plant under construction.

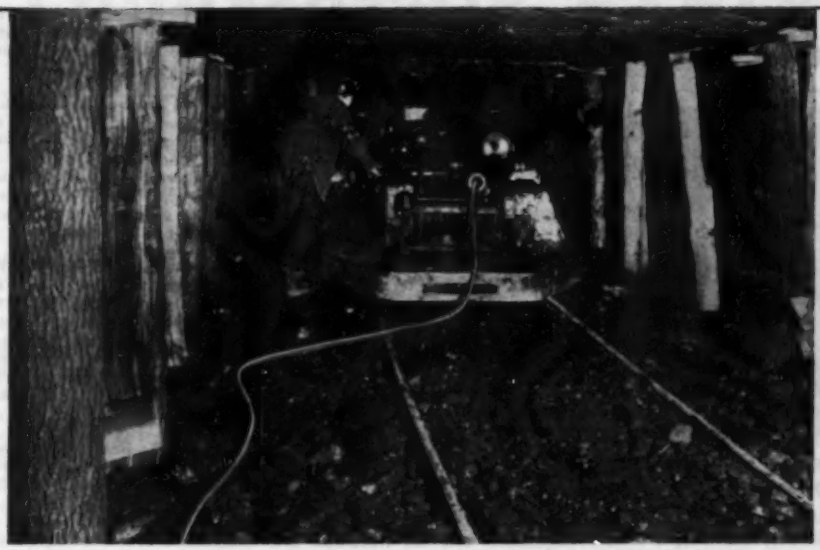
The Freeman Coal Mining Co. last month began sinking a new modern slope mine near Johnson City, Williamson County, Ill. To be known as Freeman No. 4, the mine will develop some 15 million tons of 7-ft coal, with an estimated life of 15 yr. The 16-deg slope, 1,200 to 1,300 ft long, will have a 400-tph conveyor belt and the property is being planned for all-belt operation, with rubber-tired haulage. Three railroads will serve the mine.

The Capone Coal Co. has taken over operation of the Exeter (Pa.) colliery of the Lehigh Valley Coal Co. under a direct lease from Lehigh Valley.

The Shrader Coal Co., Scranton, Pa., reportedly has begun stripping of a 15,000-acre tract near Moshannon, Pa. Initial production is planned for 600 to 700 tons daily and coal will be trucked to a loading point on the N. Y. Central.

Mine No. 7 of the Bell & Zoller Coal & Mining Co., near Staunton, Ill., was scheduled to close Aug. 31, it was reported Aug. 16. Said to be one of the oldest properties in central Illinois, the mine is the second former Consolidated Coal Co. operation in the area to be closed by Bell & Zoller. The closing May 15 of Mine No. 15, also acquired from Consolidated early this year, precipitated an Illinois legislative investigation into the reasons for the shutdown at the demand of PMWA officials. In testifying before the committee, company officials said that both were "losing mines" and that after arrangements for their sale had fallen through it was decided to close one since the entire coal acreage could be served through one shaft. Later in its report, the legislative committee backed up the company by pointing to the reduced market demand as cause for the closing.

Re-opening of the Somerset (Colo.) mine of the Utah Fuel Div. of the Kaiser Steel Corp., closed since last May 16, was scheduled for Aug. 16 as a result of an anticipated increase in demand for its output for commercial use. The mine was closed last May, the first shutdown in its 49 yr of operation, because of lack of orders.



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Modulus @ 200% elongation, lbs./sq. in.....	500	1000–1200
Elongation, per cent (from 2")...	300	450– 550
Set test, in inches.....	2⅜ (Max.)	2⅛–2⅛
Tear test, lbs.....	....	80– 100
AGED		
96 hours in oxygen bomb @ 70C.		
Tensile strength, lbs./sq. in.....	1600	2800–3000
Elongation, per cent (from 2")...	250	400– 450
AGED		
168 hours in air oven @ 70C.		
Tensile strength, lbs./sq. in.....	1600	2800–3000
Elongation, per cent (from 2")...	250	400– 450
OIL TEST		
18 hours in oil @ 121C.		
Tensile strength, lbs./sq. in.....	60	65– 70
Elongation, per cent (from 2")...	60	65– 70

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Among the Manufacturers



Goodrich Completes $5,000,000 Belt Plant

AMONG FEATURES of the new $5,000,000 industrial belting plant recently put in operation by the B. F. Goodrich Co., Akron, Ohio, is this $235,000 giant rotary curing press which was specially designed for the plant to permit continuous production of flat belting or rubber matting. The new 150,000-sq ft plant is said by Goodrich to be the most modern in the world and will enable the company to meet the demand for larger conveyor belts with higher lifts and longer single "flights" to handle heavier loads and harder impacts. Goodrich can now produce conveyor belting in single rolls weighing up to 35 tons, or as large as rail and truck facilities can handle, it says.

Robert E. Huthsteiner has been elected president of Cummins Engine Co., Inc., Columbus, Ind., succeeding J. Irwin Miller, who becomes chairman of the board. Clessie L. Cummins, founder of the 33-yr-old company and formerly chairman of the board, has been named honorary board chairman. Mr. Huthsteiner, executive vice president for the last 2 yrs, joined the company in 1942 as sales manager and also has served as treasurer and general manager.

C. Fred O'Connor has been named sales representative for the National Mine Service Co. in the Fairmont, Clarksburg, Wheeling and Morgantown area of West Virginia. Formerly associated with the General Electric Co. and General Electric Supply Corp., Mr. O'Connor will have headquarters in Fairmont and work in conjunction with the Whiteman Div. of National Mine Service.

The appointments of John M. Martin as assistant general manager and J. Joseph Kelleher as assistant director of sales of the explosives department have been announced by the Hercules Powder Co., Wilmington, Del. With Hercules since 1934, Mr. Martin was named manager of the Hercules explosives office in Pittsburgh, Pa., at the close of World War II and since October, 1947, he has served as assistant general manager of the cellulose products department. Mr. Kelleher joined Hercules in 1929 and has held various managerial sales posts, becoming assistant sales manager in 1949.

Lincoln Engineering Co., St. Louis, has named John E. Renner general sales manager. Associated with the organization for 15 yr, Mr. Renner has successively held positions of sales representative, automotive merchandise manager and sales manager of the automotive division.

Kennametal, Inc., Latrobe, Pa., has named Ivan J. (Dutch) Kinter as sales and service representative for the territory of New Mexico, Arizona, and eastern and southern Colorado. Previous to his appointment, Mr. Kinter had spent more than 20 yr on the production staff of the Rochester & Pittsburgh Coal Co., Indiana, Pa.

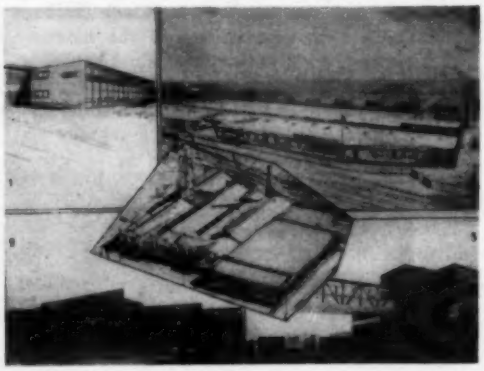
James C. Barney has been appointed assistant manager of sales for the wire rope division of John A. Roebling's Sons Co., Trenton, N. J., replacing the late George B. Stoess. Associated with Roebling for the past 26 yr, Mr. Barney has been assistant manager of its Los Angeles district office since 1947. John P. Kadlic has been appointed Philadelphia district sales manager for the wire rope division, replacing Vincent L. Daulton, who lost his life in a recent train wreck. Prior to his new post, Mr. Kadlic was the company's sales representative in the St. Louis area.

L. F. Shoemaker has been elected vice president of the Buda Co., Harvey, Ill. Associated with Buda for 31 yr, Mr. Shoemaker served many years



Allis-Chalmers Opens New Atlanta Branch

KEYNOTING ALLIS-CHALMERS' EXPANSION in the growing South is this new stream-lined factory branch recently opened at 4646 Peachtree Blvd., Atlanta (Chamblee), Ga. The new 8-acre property features a one-story structure with 60,000 sq ft of floor space, plus 8,000 sq ft of docks for trucks and rail shipments and 2 acres of outside paved and fenced area for parking and special machinery handling. Planned after a wide study of branch buildings and facilities, the branch utilizes the most modern and efficient methods of servicing dealers, and handling repair parts.



SKF Begins $10,000,000 Plant Expansion

CONSTRUCTION now is under way in the $10,000,000 plant expansion, equipment and machinery replacement program of SKF Industries, Inc., Philadelphia. Included in the program as shown above are: (1) laboratory addition at the Philadelphia Plant No. 1; (2) new building fronting on the Pennsylvania R. R. to house finished stores; (5) bridge connecting main factory with new addition; (3) addition to Shippensburg, Pa., plant to step up output of retainers; and (4) expansion at the Philadelphia No. 2 plant to provide new and larger heat-treating facilities.

LOCOMOTIVE CABLES

Roebling ROEPRENE Mine Locomotive Cables

last longer . . . cost less on the job!

ROEBLING PUTS EXTRAS into Roeprene Cables . . . gives their outer jackets a special curing that makes them tougher and better able to withstand the roughest sort of wear. They're outstandingly flexible, too. Their single conductor is insulated with a heat- and moisture-resistant compound. The Roeprene sheath is permanently bonded to the insulation by open reinforcing cords.

A big part of Roebling's complete electrical wire and cable line is now required in our nation's rearmament program, but your Roebling Distributor and the Roebling organization will certainly try to render the best service possible. John A. Roebling's Sons Company, Trenton 2, New Jersey.



Tinned, copper conductors, Class G and H, rope stranded for greater flexibility, and increased flex-life.

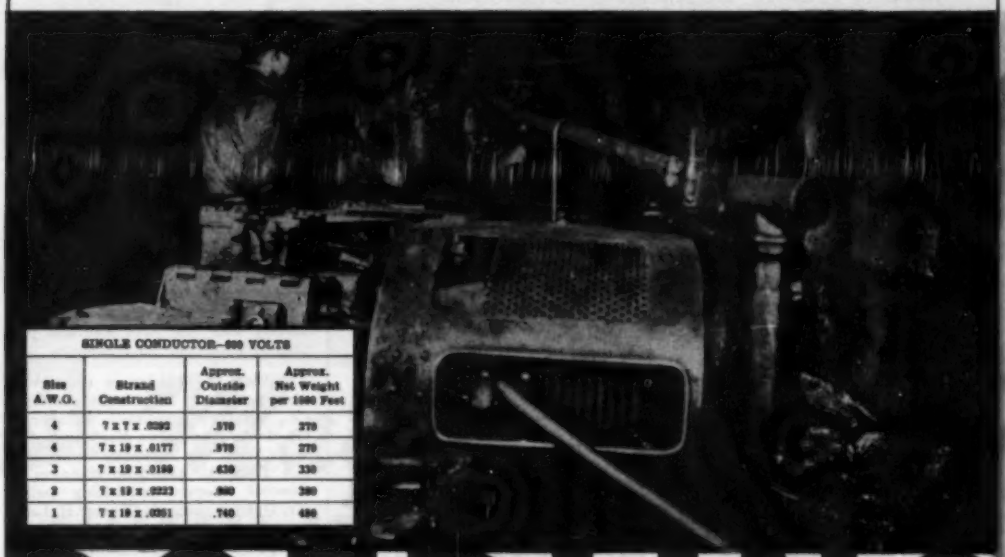
Insulated with high grade heat resistant rubber compound for longer mine service life.

Woven cotton reinforcing imbedded in jacket and insulation, bonding the cable into a solid unit without affecting flexibility.

Roeprene (Neoprene) sheath, lead mold cured for high mechanical strength and resistance to abrasion, sunlight, cutting, oils, acids, greases and alkalies.

FLAME RESISTANT

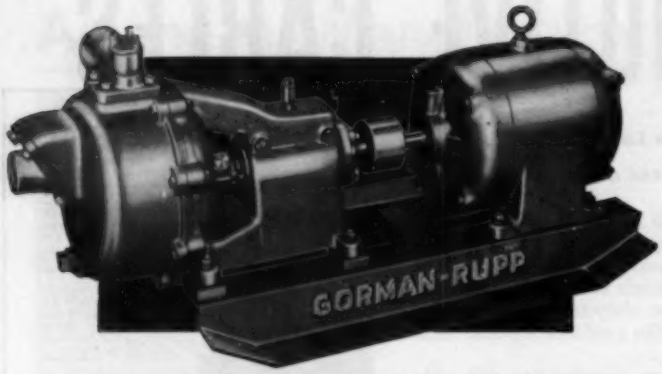
Roebling Roeprene Mine Locomotive Cables are marked P-111-BM, indicating approval by the Pennsylvania Bureau of Mines, and acceptance by the U. S. Bureau of Mines.



SINGLE CONDUCTOR—600 VOLTS			
Size A.W.G.	Strand Construction	Approx. Outside Diameter	Approx. Net Weight per 1000 Feet
4	7 x 7 x .0292	.570	270
4	7 x 19 x .0177	.570	270
3	7 x 19 x .0199	.630	330
2	7 x 19 x .0223	.690	380
1	7 x 19 x .0281	.740	480

ROEBLING

Atlanta, 934 Avon Ave ★ **Boston**, 51 Sleeper St ★ **Chicago**, 5525 W. Roosevelt Rd ★ **Cincinnati**, 3253 Fredonia Ave ★ **Cleveland**, 701 St. Clair Ave, N.E. ★ **Denver**, 4801 Jackson St ★ **Detroit**, 915 Fisher Building ★ **Houston**, 6216 Navigation Blvd ★ **Los Angeles**, 216 S. Alameda St ★ **New York**, 19 Rector St ★ **Odessa, Texas**, 1920 E. 2nd St ★ **Philadelphia**, 230 Vine St ★ **San Francisco**, 1740 17th St ★ **Seattle**, 900 1st Ave, S. ★ **Tulsa**, 321 N. Cheyenne St ★ Export Sales Office, **Trenton, N. J.**



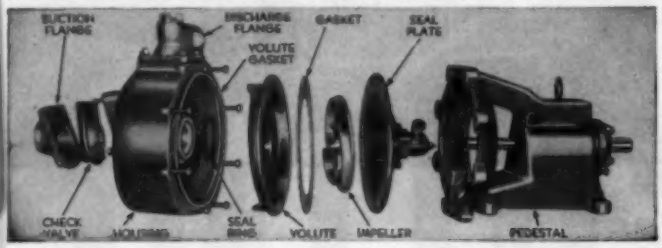
GORMAN-RUPP PUMPS
SAVE MONEY in mine operations

- **They save in maintenance**—because of their extreme simplicity of design—the impeller is the only moving part. Any wearing parts quickly and easily replaced with common tools.
- **They save costly shut-down time**—they will run indefinitely requiring little or no attention, are automatically self-priming—ideal for remote location and control.
- **They save 40% pumping costs**—with the increased efficiency of the Gorman-Rupp design, 3 H.P. does what formerly required 5 H.P.

These pumps are furnished bronze fitted, and all bronze construction.

Gorman-Rupp pumps maintain nearly normal capacity under any working head. They require very low headroom and are efficient and reliable.

Write for Bulletin No. O-ME-11



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Mine Service Company, Lothair, Ky.
Reliable Electric & Equipment Co., Zanesville, Ohio
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W. Va. Pump & Supply Co., Huntington, W. Va.
Central Mine Supply Co., Mt. Vernon, Illinois

THE GORMAN-RUPP COMPANY
306 BOWMAN STREET, MANSFIELD, OHIO

COMING MEETINGS

Pocahontas Operators' Association: fall meeting, Sept. 21-23, The Homestead, Hot Springs, Va.

ASME: fall meeting, Sept. 26-28, Hotel Radisson, Minneapolis, Minn.

Central Pennsylvania Coal Producers' Association and Eastern Bituminous Coal Association: annual meeting, Sept. 26-27, Bedford Springs Hotel, Bedford, Pa.

National First-Aid and Mine-Rescue Contest: Oct. 2-4, Columbus, Ohio.

Thirty-ninth National Safety Congress and Exposition: Oct. 8-12, Stevens, Palmer House, Congress and Morrison Hotels, Chicago, Ill.

Joint Fuels Conference, AIME Coal Division and ASME Fuel Section: Oct. 11-12, Hotel Roanoke, Roanoke, Va.

Illinois Mining Institute: annual meeting, Nov. 2, Hotel Abraham Lincoln, Springfield, Ill.

Pocahontas Electrical & Mechanical Institute: Nov. 26, Bluefield, W. Va.

as regional representative and in distributor and branch retail sales and for the last 12 yr has been in the executive sales capacity as manager of industrial engine sales division and then as engine sales manager.

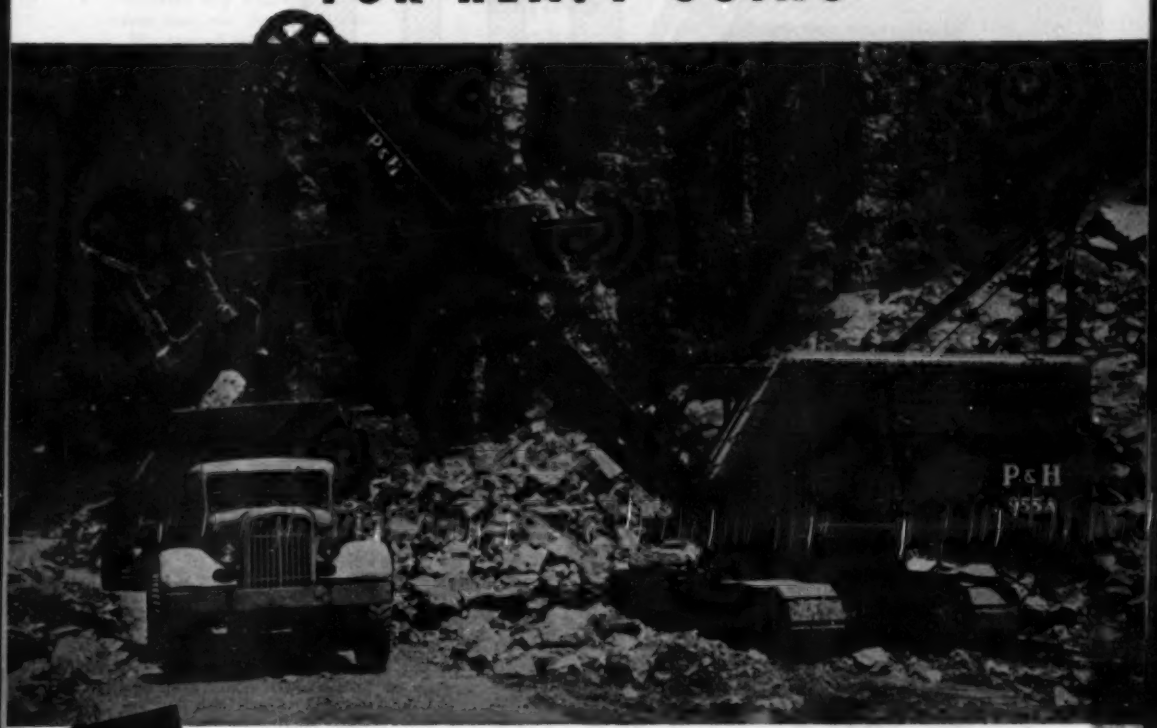
Diamond Mfg. Co., Wyoming, Pa., has elected David C. Hall president and general manager, succeeding the late William M. Powell. Mr. Hall previously was vice president and purchasing agent for the company.

William V. O'Brien, a commercial vice president of General Electric Co., has been appointed manager of the firm's Apparatus Marketing division. With the company since 1922 and formerly assistant manager of General Electric marketing policy, Mr. O'Brien succeeds Chester H. Lang, vice president, who now heads the GE public relations organization. The appointment of L. Maynard Stauffer as manager of General Electric's Rocky Mountain Apparatus district with headquarters in Denver, also has been announced. Mr. Stauffer joined GE in 1925 and formerly was manager of the district's Salt Lake City office. As district manager, he succeeds F. H. Doremus, who died recently.

Rodger J. Mueller, in the company's Pittsburgh office for the last 4 yr, has been appointed manager of The Falk Corp.'s Youngstown, Ohio, office. D. B. Bodholdt has succeeded Mr. Mueller in the Pittsburgh office under the direction of D. Adams. D. R. O'Hare has

ROCK RATED!

FOR HEAVY GOING



P&H *Magnetorque**

SLICKEST SWING YOU'VE EVER KNOWN

It's everything you've wanted for more profitable rock handling . . . It's the P&H 955-A (2½ yd. shovel) . . . newer . . . better . . . proving it where the going is heaviest. Here's why:

P&H MAGNETORQUE ELECTRIC SWING. The smoothest, slickest swing you've ever known . . . yours for the full life of your machine. Old style swing frictions are *out* . . . all their troubles, adjustment and replacement costs.

SMOOTHER OPERATION means less strain on machine and operator. **GREATER STABILITY** gives you increased digging ability. **ALL-WELDED** for maximum strength.

Ask to see the one working nearest you. It's the 2½ yd. version of the famous 1055 (3½ yd.).

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4540 W. National Ave.
Milwaukee 14, Wisconsin

*T. M. of Harnischfeger Corporation for electro-magnetic type clutch.

EXCAVATORS • OVERHEAD CRANES • HOISTS • ARC WELDERS & ELECTRODES • SOIL STABILIZERS • CRAWLER & TRUCK CRANES • DIESEL ENGINES • CANE LOADERS • PRE-ASSEMBLED HOMES

adding feeder and power cable?



unless you figure in aluminum, you don't figure low

Figure your feeder and power cables both ways—in aluminum and in copper. You'll find you make worth-while savings with aluminum!

Now, *add* to those savings. Aluminum's lighter weight means it can be installed faster, with less effort. Mine operators have cut wire crew time by as much as 50% as a result of the ease with which men handle the lighter cable.

Although the rearmament program prevents unrestricted sale of aluminum, we are ready to help you with the planning required for mine projects involving electrical wiring.

Get the facts! Write for free booklet, "Questions & Answers About Aluminum Conductors and Installations." ALUMINUM COMPANY OF AMERICA, 1779J Gulf Building, Pittsburgh 19, Pennsylvania.



Aluminum Conductors

ALCOA ALUMINUM

of ALCOA ALUMINUM are made by leading manufacturers

EQUIPMENT APPROVALS

Five approvals of permissible equipment were issued by the U. S. Bureau of Mines in July, as follows:

Joy Mfg. Co.—Type TIC-3PG/H mining-machine truck; two 4-hp motors, 220 and 440 v, AC; Approvals 2-798 and 2-798A; July 11.

Goodman Mfg. Co.—Type RHT-2 tractor truck; two 5-hp motors, 250 v, DC; Approval 2-799; July 12.

Albert & J. M. Anderson Mfg Co.—Distribution box; single-outlet, 225-amp frame circuit breaker, 250 v, DC; Approval 2-800; July 24.

Lee-Norse Co.—Type MT22-3K drill truck; one 7½-hp and one 3-rp motor, 250 v, DC; Approval 2-801; July 30.

Joy Mfg. Co.—Type T54-1PLE timber setter; one 10-hp motor, 250 v, DC; Approval 2-802; July 31.

been named to assist D. S. Ferree in the Philadelphia office.

M. B. Garber, director of sales, Thew Shovel Co., Lorain, Ohio, has been appointed director of the Construction Machinery Division of NPA. A consultant to the division for the past 6 mo on an on-call basis, Mr. Garber headed up the WPB Construction Machinery Division during World War II.

William G. Sternberg has been elected a vice president of the White Motor Co., in charge of the Sterling Div., with headquarters at Milwaukee. Since 1936 Mr. Sternberg has been president of the Sterling Motor Truck Co., which has been acquired by White and will be operated as a division of the company. Two other appointments in the Sterling Div. include that of Ernest R. Sternberg as general manager and J. P. Dragin as vice president in charge of finance.

Howard A. Reid, formerly foreign sales promotion manager, Union Carbide & Carbon Corp. has been appointed sales promotion and market analysis manager, General Cable Corp., New York.

Harold A. Miller has been appointed general staff manager, general sales department, U.S. Steel Supply Co., Chicago. Formerly sales personnel manager, Mr. Miller succeeds William C. Etheredge, who joins the price division of the commercial department of U. S. Steel in Pittsburgh.

Fairbanks, Morse & Co., Chicago, will immediately begin construction of a new plant near Kansas City, Mo., at an estimated cost of $7,500,000, including machinery and equipment, Robert H. Morse Jr., president, has reported. Originally planned as a

Here's My Favorite Jack



FOR LIFTING JOBS IN AND AROUND MINES



No. 814-MT for THIN SEAM
No. 816-MT for THICK AND THIN SEAM
No. 831-MT for THICK SEAM

DUFF-NORTON

5 TON RATCHET LOWERING JACK

Mining men everywhere tell us, "Duff-Norton 5 Ton Ratchet Lowering Jacks give dependable, long-lasting service in all lifting jobs in and around mines. They speed up rerailing of locomotives and cars; brace cutters, loaders and continuous mining machines; increase efficiency in track maintenance and shop repair work." You can't beat that for a recommendation. Why not order these jacks for your mine.



Write for Handy Mine Jack Guide!

You should have a copy of this handy booklet, which illustrates and describes in detail jacks that can make your lifting and lowering jobs easy and economical. Write for your copy today.

DUFF-NORTON JACKS

THE DUFF-NORTON MANUFACTURING CO.

MAIN PLANT and GENERAL OFFICES, PITTSBURGH 30, PA.—CANADIAN PLANT, TORONTO 9, ONT.

"The House that Jacks Built"



Better screening with BEE-ZEE round rod screens

Better screening means less coal being lost to the slurry pile—*more money* for you! Find out about Bixby-Zimmer Round Rod Screens for your coal processing work. Bee-Zee Screens can give more efficiency to your screening equipment than you believed possible!



ROUND TOP RODS

Bee-Zee Screens can slowly wear halfway down before the screen opening changes! Exclusive round rod design keeps screen accurate—is one reason why coal operators report Bee-Zee Screens last 10, 20—even 30 times longer.



FINE POINT OF CONTACT

Round top rods meet round tie rods at one fine point of contact, without forming a "pocket" to cause blinding or clogging. This means faster dewatering, too—preventing wintertime freeze-ups.



WELDED STEEL CONSTRUCTION

Top and tie rods are stainless steel, precision spot welded to form a screen with built-in tension to resist stresses and strains. Bee-Zee Screens won't rust or corrode, stand up under abrasive action.

SEND FOR FREE CATALOG

Write for the complete Bee-Zee catalog, explaining all the money-making features of Bee-Zee Round Rod Screens and their use in coal processing. No cost or obligation.



BIXBY-ZIMMER ENGINEERING CO.

190 ABINGDON STREET, GALESBURG, ILLINOIS

Bee-Zee Screens can be fitted to any coal processing equipment.

scale plant, the project has now been enlarged to approximately 500,000 sq ft of floor space, including a foundry, and is to be used to make engines and pumps, with almost 1,000 workers employed. Scale manufacturing operations of the company will be expanded, according to Mr. Morse.

The Whitney Chain Co., Hartford, Conn., has been granted a NPA Certificate of necessity to expand its manufacturing capacity, which it will apply against construction and equipping of a new plant in Longview, Tex. It is expected that about 18 mo will be required to complete the new plant, and expansion of the company's Hartford facilities is under way in the meantime.

American Cyanamid Co., New York, in a move to improve sales and distribution services to customers and at the same time to lower administrative costs, has consolidated its several office and warehouse locations in Chicago and St. Louis into one newly constructed building in each city. The two moves are part of an overall company plan which calls for other consolidations in major cities of the United States and Canada. The new facilities in Chicago and St. Louis, built to Cyanamid's specifications, offer 100,000 and 30,000 sq ft of space, respectively.

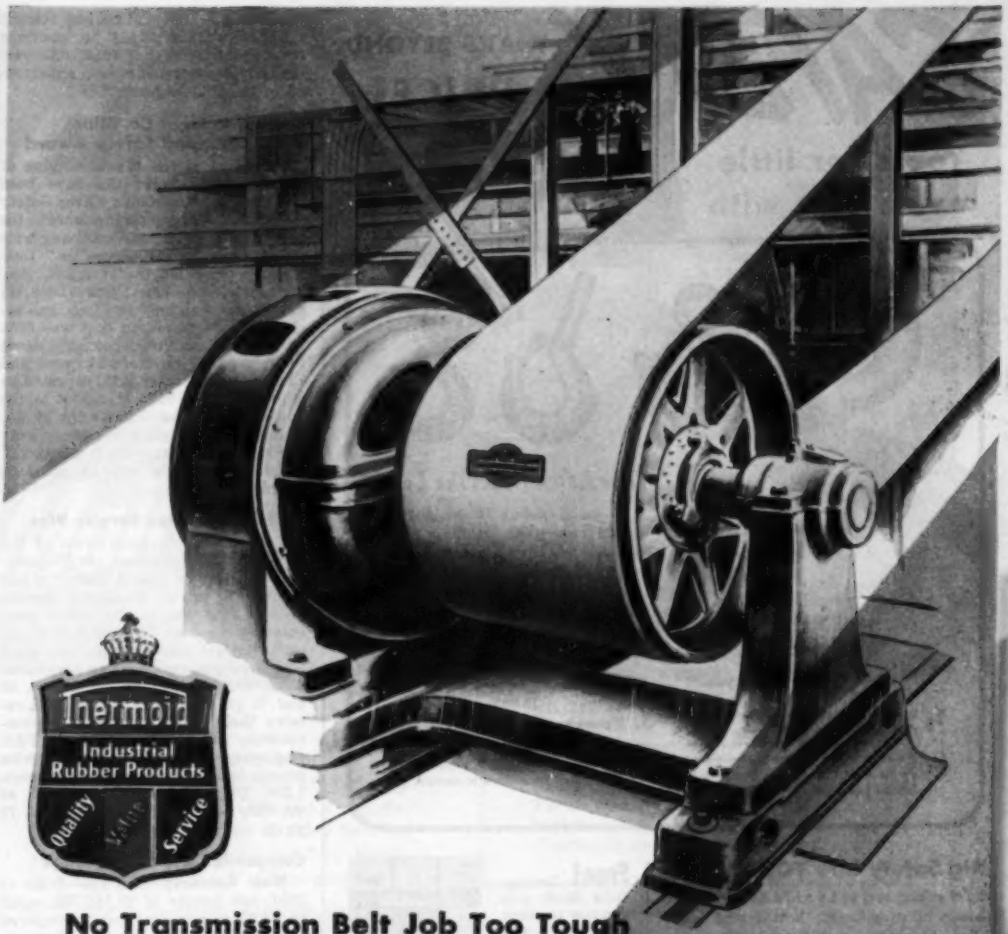
News Briefs . . . From p 128

New W. Va. Institute Formed

The newly formed Mid-State Coal Mining Institute has been organized to promote safety and first-aid work in Webster, Nicholas, Greenbrier, Pocahontas and Clay counties, West Virginia. Regular monthly meetings are held the fourth Friday of each month and the institute's first Miners' Safety Day and First-Aid Contest was scheduled for late August. President of the new organization is S. Dunlap Brady, Jr., Gauley Coal Co., Summersville, W. Va. Joseph C. Kessler, safety director, Elk Lick Coal Co., Richwood, is secretary-treasurer. Vice presidents are: Ed Hough, Imperial Smokeless Coal Co., Quinwood; B. H. Cutright, safety director, Pardee & Curtin Lumber Co., Webster Springs; Warden C. Weaver, superintendent, Nicholas-Webster Coal Corp., Craigsville; W. H. Seelinger, general superintendent, Johnstown Coal & Coke Corp., Richwood; and Burke Johnson, Panther Coal Co.

Utilities' Coal Consumption Seen Heading for New Peak

Consumption of coal by electric utilities will set a new record high in 1951, the Secretary of the Interior predicted late in July. Utilities used 43,115,043 tons of coal from January through May, 1951, a jump of 7.3% over the first 5 mo of 1948, the previous peak year, and 22.5% over the same period in 1950. In a report to Secretary Chapman, Charles W. Connor, DSFA administrator, said that



Thermoid
Industrial
Rubber Products
Quality
Value
Service

No Transmission Belt Job Too Tough ...For Thermoid

Have you some really tough transmission jobs—regular belt killers? They won't be too tough for a Thermoid Transmission Belt. Let your Thermoid Distributor prove that by furnishing exactly the right belt for your job.

For general service he will offer "400", the all-purpose belt that will satisfactorily service all normal operating requirements.

For severe service, or for high speeds with small pulleys, he will recommend Thermoid High Speed "R", made with extra strong, hard 35-oz. duck and top grade rubber. Where there are oil or fumes injurious to rubber, he will recommend Thermoid High Speed "N", with Neoprene friction and skim. Each type is practically custom-built for the service for which it is recommended.



Here's The Book That Will Answer Many of Your Questions

Ask for your free copy of Technical Bulletin No. 3678. It contains practical information, charts, tables and diagrams which will help you select the right transmission belt for your requirements.

Conveyor & Elevator Belting • Transmission Belting
F.H.P. & Multiple V-Belts • Wrapped & Molded Hose

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Rubber Sheet Packings • Molded Products
Industrial Brake Linings and Friction Materials

Thermoid Company • Offices & Factories: Trenton, N. J., Nephi, Utah

SAFETY THAT'S BEYOND PRICE!

Yours for little extra cost with **LAUGHLIN Safety Hooks**



"The Latch Locks the Load"

Laughlin Safety Hooks, costing little more than ordinary hoist hooks, pay for themselves many times over by preventing accidents. That sturdy safety latch guards against dangerous failure — mechanical or human — in a number of important ways. For example:

1. It prevents load from slipping or jarring loose in mid-air.
2. It eliminates the hazard of carelessness — the load that was *supposed* to be lashed but wasn't.
3. It prevents overcrowding the hook.
4. It warns of hook failure, because latch will open if hook starts to spread.

Rig Safety into YOUR Hoists

by changing over to Laughlin Safety Hooks. Made of drop-forged, heat-treated steel, they have pressed steel latches in the smaller sizes, cast bronze latches in the larger sizes, all with stainless steel springs. Available in various types for 750 lb to 15 ton safe working loads at your mine, mill or oil field supply house.

Free! Catalog-Data Book tells you how to select the *right* wire rope and chain *fitting* for every job. Complete specifications — helpful tables. Use the coupon below.



SEND IN TODAY ... no cost or obligation

THE THOMAS LAUGHLIN COMPANY
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LAUGHLIN

THE MOST COMPLETE LINE OF DROP-FORGED WIRE ROPE AND CHAIN FITTINGS



the strong demand for coal by electric utilities was expected to continue throughout the rest of 1951, with particularly heavy consumption anticipated in the fourth quarter.

Duquesne Light Co. Mine Wins Company Safety Award

Personnel of the Warwick mine of the Duquesne Light Co. have been awarded the President's Silver Safety Award for their top performance in the second quarter of the company-wide "Year Long Safety Campaign." During the three months of April, May and June, the mine worked 349,319 man-hours with only two lost-time accidents, a performance that was 66% better than its frequency experience of the past 5 yr. Harwick mine and Cheswick & Harmar R.R., reported as a group in the contest, added to the laurels of the coal department by finishing in second place in the company during the quarter, with a safety improvement of 45.6% over the previous average.

P&R Inaugurates Service Pins

As a token of appreciation of the service of its employees, the Philadelphia & Reading Coal & Iron Co. last month set up an Employee Service Award Program. In the initial presentation, held at the company's annual first-aid meet, service pins went to one person representing employees with records of 10, 20, 30, 40, 50, 60 and 70 yrs of service. Others will receive their pins from their superintendents or department heads. P&R employees in the various service groups total as follows: 10 yr or more, 1,318; 20 yr, 1,726; 30 yr, 1,247; 40 yr, 466; 50 yr, 92; 60 yr, 14; and 70 yr, 1.

Companies Report Earnings

West Kentucky Coal Co.—6 mo of 1951, net income of $1,156,760, equal to $1.35 a common share, compared with $1,877,801, or $2.19 a share, in the same period of 1950.

Ayrshire Collieries Corp. and subsidiaries—Year to June 30, net income, $2,678,744, equal to $4.71 a share, compared with $1,219,249, or $2.14 a share, the previous year.

Lehigh Coal & Navigation Co. and subsidiaries—6 mo of 1951, net profit after taxes, $700,644, or 36c per share, compared with $943,876, or 49c a share, in the same period of 1950.

Pennsylvania Coal & Coke Corp.—6 mo, net profit after a $105,591 credit resulting from the elimination of an over reserve for income taxes totaled $133,323, or 90c a share, before depreciation and depletion; compared with a net of $22,391, or 15c a share, before depreciation and depletion for the first 6 mo of 1950.

Island Creek Coal Co. and subsidiaries—First half of 1951, net profit after preferred-stock dividend requirements, $2,297,555, or $1.93 per share of common stock, compared with $2,-

GM Diesels Cost Less to Maintain



"MAINTENANCE expense on our GM Diesels is lower than on other makes of power," states E. E. Coleman, manager, Bradley Mining Co. The Bradley fleet includes five Euclid trucks and four Koehring dumptors—*all GM Diesel-powered.*

GM Diesel's 2-cycle operation means less wear and tear on parts, longer engine life. Because power is delivered on every piston downstroke, pistons and other moving parts do not have to travel nearly as far to produce a given power output.

Two-cycle design also makes GM Diesels far more compact than other Diesels of equal horsepower. Parts are lighter weight and easier to get at. GM unit injectors eliminate troublesome high-pressure fuel lines and are individually replaceable.

One of a fleet of five GM Diesel-powered Euclids owned by Bradley Mining Co., Stibnite, Idaho, nation's largest producer of antimony ore.

Finally, all GM Series 71 engines have the same cylinder size, which means that most parts are interchangeable in any unit from 2 to 24 cylinders. Interchangeability of low-cost Factory-Engineered parts saves mechanics' time and reduces parts inventories. It cuts down service time—keeps GM Diesels on the job.

For full information on these hard-working, easy-to-maintain 2-cycle Diesels, consult your nearby GM Diesel distributor or write us direct.

ANSWER THE CALL CIVIL DEFENSE

DETROIT DIESEL ENGINE DIVISION

SINGLE ENGINES ... Up to 275 H.P. **DETROIT 28, MICHIGAN** MULTIPLE UNITS ... Up to 800 H.P.

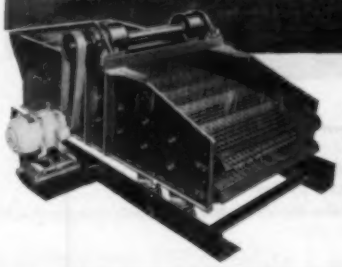
GENERAL MOTORS

GM GENERAL MOTORS DIESEL POWER

DIESEL BRAWN WITHOUT THE BULK

A Sound Investment in Any Modernization Program





At the Oak Grove Coal Company, a 3' x 6' Deister Double-Deck Vibrating Screen handles the coal direct from the scalper dumped at the rate of a 2 ton skip load every three minutes. A second Deister Screen is the next step in their modernization program.

Today, the Oak Grove Mine near Terre Haute, Indiana, is producing up to 50 tons an hour of clean, accurately-sized coal to serve a growing list of customers. But five years ago, when the Jones brothers took over, this shaft mine was operating at a competitive disadvantage.

In their long-range program for recapturing markets by preparing their coal to meet customers' more exacting requirements, they purchased, last year, a 3' x 6' double-deck Deister Vibrating Screen, equipped with a ¼" cloth on the top deck, a ⅜" cloth on the bottom deck.

And, now according to C. H. (Coy) Jones, one of the partners:

"This Deister Screen has proved so satisfactory in producing accurately graded coal at a top production rate, that we are planning to install a second Deister Vibrating Screen."

Mine operator after coal mine operator can report from long experience that Deister Vibrating Screens assure better sizing cheaper . . . assure more marketable coal with less investment in operating costs and maintenance than any other screen. Write today for complete information about Deister Products for low-cost coal preparation.

DEISTER SCREENS

DEISTER MACHINE COMPANY

FORT WAYNE 4, INDIANA

102,286, or $1.77 per share, for the first 6 mo of 1950.

Pond Creek Pocahontas Co. and subsidiaries—First 6 mo of 1951, net profit, $1,165,094, or $3.43 a share, compared with $1,288,127, or $3.79 a share, in the 1950 period.

Joy Mfg. Co. and wholly owned subsidiaries—9 mo to June 30, net profit of $4,072,642, or $4.62 a share, on net sales of $51,234,786; compared with a net of $2,011,187, or $2.28 a share, on sales of $31,174,293 in a similar period ending June 30, 1950.

1950 Company Output Compiled by Keystone

In 1950, 813 coal operating companies produced 427,486,799 tons, or 83.5% of the estimated total of 512,000,000 tons, according to 1950 Coal Production by Companies, an annual compilation issued last month by the *Keystone Coal Buyers' Manual*, a *Coal Age* affiliate. The booklet lists 1950 tonnages of all producers of 100,000 tons or more arranged by size of output and indicates company affiliations, deep- and strip-mined output and states in which operation is carried on.

Freight-Car Output Falls

New freight cars produced during July totalled only 5,290, as compared with 9,644 cars built in June and the current goal of 10,000 cars monthly. Strikes in seven plants and floods affecting others were cited for the drop. Orders for 2,417 cars were placed during July, with unfilled orders totaling 144,610 cars as of Aug. 1. In warning of a shortage of hopper and gondola cars this fall, Charles W. Connor, DSFA administrator, pointed out that their loadings in the second quarter of 1951 averaged 405,230 weekly, nearly a 10% jump over the same 1950 period. With only 790,000 such cars at present, average loadings of 500,000 weekly could create a critical shortage, it is emphasized.

Union Presses Ky. Drive As 4,000 Stage Rally

Officials of District 19, UMWA, pledged full support of their organization in the unionization of mines in Leslie County, Kentucky, before an estimated 4,000 union members at a rally held in Hyden, Ky., July 28. Preceded by disturbances and arrests in the area several weeks earlier, the rally nevertheless was a peaceful affair without incident. Union officials told the crowd that they would move into nearby Clay County as soon as the drive in Leslie County ended.

British Foresee Renewal Of Coal Crisis This Winter

Although British coal stocks have been increasing in recent months, their growth has not been as rapid as during the previous year and the continuing high level of consumption coupled with an insufficient increase in the coal mined indicated strong prospects of a critical shortage in the

WHAT WOULD **YOU** SPECIFY . . .

Fluid	Concentration	Temp.	Type of Valve	Valve Material
1 Sulphuric Acid	20%	150 F.		
2 Sulphuric Acid	100%	180 F.		
3 Hydrochloric Acid	33%	80 F.		
4 Hydrofluoric Acid	80%	125 F.		
5 Beer		200 F.		
6 Oxygen		Ambient		



We supplied Grinnell-Saunders Diaphragm Valves with . . .

Body Material	Diaphragm Material
1 Rubber lined	Natural rubber
2 Cast iron	KEL-F
3 Glass lined	Butyl
4 Magnesium	KEL-F
5 Polished bronze	White diaphragm
6 Cast iron*	Neoprene

*For oxygen service a high flash point lubricant is supplied. All valves for oxygen service are subjected to 300 lb. air underwater test.

In several of these cases other body materials or diaphragms would serve as well. But the really important fact is the unmatched versatility of Grinnell-Saunders Diaphragm Valves in handling corrosive fluids, gases, compressed air, food and suspended solids . . . in lines where corrosion, abrasion, contamination, clogging, leakage and maintenance are problems.

Grinnell-Saunders Valve bodies are stocked in cast iron, malleable iron, stainless steel, bronze, and aluminum, with other materials available on special order. Valve bodies can be lined with lead, glass, natural rubber or neoprene. Diaphragms are available of natural rubber and a number of synthetics to suit particular service conditions.

The Grinnell-Saunders Valve Division will be pleased to submit recommendations upon receipt of complete information covering service conditions.

Features of the Grinnell-Saunders Diaphragm Valve

- diaphragm absolutely isolates working parts from fluid
- diaphragm lifts high for streamlined flow in either direction
- diaphragm presses tight for positive closure
- body, lining and diaphragm materials to suit service
- simple maintenance—diaphragm easily replaced

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Three Types of Heads

"FS" FlatSwivel for use with wooden pieces. (On jack at left).

"C" for square and round timbers.

"F" for small H beams and rails.

SIMPLEX PIN-UP JACKS
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Double lever sockets, 5-ton capacities, for coal cutting and loading machines, unrailing cars, shop, track work.

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coming winter months, government officials reported during July. The situation called for new appeals to miners for greater output and to industrial and domestic consumers for drastic economies in consumption, it was said.

Coal production in Britain up to July 14, 1951, was 120,833,000 tons, compared to 118,099,800 tons in the same period of 1950. Yet up to July 7, 1951, British consumption had totaled 111,755,000 tons, against 107,266,000 tons the year previously. Some 1,167,000 tons was imported from the U.S. and cargo and bunker exports were almost halved in an effort to meet demands and at the same time build up stocks from the dangerous levels of last winter.

Last winter was the first time since 1947 that Britain had imported U.S. coal and all indications are that it will again be imported within the next few months. British shipping circles estimate that American imports will total about 2,000,000 tons in the coming winter, the Coal Exporters' Association reports.

And For Your Information . . .

A new $30-million steam-electric plant will be built by the Alabama Power Co. 22 mi from Mobile. Designed for an ultimate capacity of 1,000,000 kw, the plant will initially consist of two 125,000-kw units which will consume some 800,000 tons of coal annually. The first unit will begin operation in 1953, the second a year later.

Factory sales of stokers of all sizes totaled 9,302 for the first half of 1951, a 44% increase over the same period of 1950. Although sales in June dropped slightly as compared with sales in June, 1950, the July sales showed considerable gain over June, 1951, and over those of July, 1950.

The "George S. Rice Memorial Mining Library," recently established at the USBM Anthracite Research Laboratory, Schuylkill Haven, Pa., to be used by Bureau employees, also will be available to members of the mining industry, research students and others. The library, which contains many hundreds of technical books and reference material collected by Dr. George S. Rice, first chief mining engineer of the Bureau who died last year, was presented by Dr. Rice's widow.

In 1950 the coal industry suffered one fatality for each 1,116,635 man-hours worked, while in 1940 the rate was one fatality for every 606,000 man-hours, Secretary of the Interior Chapman pointed out last month in reviewing progress in the last 10 yr under the Federal coal mine inspection act, which became effective in 1941. Fatalities per million tons of coal mined dropped from 2.30 in 1940 to 1.15 in 1950.

The 1952 Southern Appalachian Industrial Exposition, at Bluefield, W. Va., is being scheduled for May 14-16,



900 feet of trouble-free lubrication

• When operators of this midwest mine installed a conveyor in 1949, STANOBAR No. 2 Grease was selected as the lubricant for belt idler bearings on the recommendation of a Standard Oil lubrication specialist. Nine hundred feet long, and moving coal from mine bottom to tipple, the conveyor has boosted tonnage 300 to 400 tons a day.

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J. A. Grieve, lubrication specialist at Standard Oil's Decatur office helped this midwest mine make important savings with STANOBAR No. 2 Grease. He was close at hand, able to give mine operators the kind of service they needed when they needed it.

There's a corps of such lubrication specialists throughout the Midwest, one of whom is located near your own mine. Through special training, plus a background of practical experience, this man has a knowledge of lubrication that can mean real savings to you. To obtain his services, simply contact the nearest Standard Oil (Indiana) office. Discuss with him the savings you can make with such outstanding products as:

STANOIL Industrial Oils—Here's one line of oils that provides cleaner operation of loader and crane hydraulic units; supplies effective lubrication in compressors, gear cases, and circulating systems. One or two grades can replace a wide variety of special oils and lubricants.

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2 mo earlier than has been the practice in the past to minimize interference with vacations. A second policy innovation set up at the meeting last month of the executive committee planning the show is exclusion of the general public. Large crowds attending the exposition in the past have unduly hampered display of mining machinery and equipment, the committee reported.

Four miners were drowned Aug. 14 in a mine of the Laurel Creek Coal Co., Laurel Creek, W. Va., when they apparently opened up an abandoned area full of water. A fifth man escamped by riding a locomotive to safety.

Pennsylvania Power & Light Co. will spend some $143 million during the next 4½ yr. Additional generating capacity costing $82 million will include completion of the third and fourth units at its Sudbury plant and installation of the first 125,000-kw at a new station to be built near Martins Creek, Pa.

The Bartley, W. Va., office of the Pond Creek Pocahontas Co. was robbed of $12,000 Aug. 9 by burglars who used an acetylene torch to cut open a large vault and two safes.

The Government of Burma has named Pierce Management, Inc., Scranton, Pa., to make a complete survey of its coal and mineral resources. Five Pierce engineers are assigned to the 2-yr project, and James H. Pierce, company president, is proceeding from the Philippines to Burma, where he will organize the program. Mr. Pierce also will visit the company's large construction project in Greece and tour Portugal mines before returning to the U. S. in October.

Action on the long-contested St. Lawrence Seaway and Power Project at this session of Congress appeared to be only a remote possibility July 26 as the House Public Works Committee, by a vote of 15-12, tabled the last of nine bills for authorization of the project it had considered. On the same day President Truman said he hoped the Seaway might still be brought before the entire House for a vote.

W. Va. Safety Meets Qualify National Entrants

Eight more first aid meets are scheduled during August and September in various parts of the state, the W. Va. Department of Mines pointed out at the end of July in announcing that the state-wide meet had been cancelled because of lack of funds. Arch J. Alexander, state mines chief, said that after he announced the state meet he discovered that the legislature had not provided sufficient funds in the mines department appropriations. Various teams participating in the district contests will enter the national competition in Columbus, Ohio, Oct. 2-4, he said.

Among the contests previously reported was the company-wide compe-

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tition held by the Coal Div., Eastern Gas & Fuel Associates, July 28, in which 19 teams participated. In the white division, the Powellton No. 6 team nosed out Wharton No. 2 by one point, and the Melcroft (Pa.) team took third after working off a tie with the Weeksbury (Ky.) team. In the colored division, the Helen mine team placed first by a wide margin, while Powellton No. 6 gained second over Carswell by one point. Trophies were presented to the winning teams by L. C. Campbell, vice president of the EG&FA Coal Div.

In Illinois, all eight mines of the Peabody Coal Co. have organized first aid teams, L. H. Johnson, safety engineer, has reported. Two top teams will be selected to represent the 5,000 Peabody miners at the Columbus meet through sectional elimination contests to be held on Labor Day.

Pa. Mine Teams Compete In Four Safety Contests

Taking first place with a score of 100%, the first-aid team representing National No. 3 mine, U. S. Steel Co., Muse, Pa., won the MSA plaque, National Coal Association sterling silver rings and a $350 cash prize at Uniontown, Pa., July 21. Sponsored by the Southwestern Pennsylvania Safety Association, the contest featured tight competition among 39 teams from mines in Fayette, Allegheny, Washington and Greene counties. Members of the winning team, which also received a Capitol flag from Congressman E. L. Sittler, Jr., of Pennsylvania's 23rd District, are: Ray St. Clair, captain; Rudy Renko, Joseph Stutts, Jay St. Clair, Peter Linden, Nick Heirndt, Victor Rubis and Edward Kesnick. Second and third honors were won by teams representing Westland No. 1, Pittsburgh Coal Co., Div. of Pittsburgh Consolidation Coal Co., Westland, Pa., and Nemacolin mine, Buckeye Coal Co., Nemacolin, Pa., respectively.

At Indiana, Pa., July 28, the team representing Diamond No. 2 mine, Imperial Coal Corp., Boltz, Pa., won top honors with a score of 100%, in a 22-team contest sponsored by the North Central District Safety Association. The winning team, which was awarded the MSA plaque by George Deike, president, Mine Safety Appliances Co., and a cash prize, included the following members: R. W. Davis, captain; John Pabrazinsky, J. E. Dixon, V. C. Rengh, John Torok, John Simon and Nick Martich. Other winning teams were: Kent No. 2, Rochester & Pittsburgh Coal Co., second place, and Kent No. 1, R&P, third.

At New Kensington, Aug. 11, teams representing Harwick mine, Duquesne Light Co., Harwick, Pa., and the Harwick Boy Scouts were winners in the 10th annual contest of the Allegheny-Kiski Safety and First Aid Association. Members of the winning team, Harwick No. 1, are: Michael Kandziolka, captain; Joe Wilkosz, Edward Wilkosz, Louis Bott, Joe Pitlock and

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Emolie Saldari. Other winners were: Harwick No. 2, second; Indianola mine, Republic Steel Corp., third; Renton No. 3, Pittsburgh Coal Co., fourth; and Russellton mine, Republic Steel Corp., fifth. In the Boy Scout competition, which was a special feature of the meet, the four teams representing the Harwick troop finished in the four top places.

Winner of the 11th annual first-aid meet of The Hudson Coal Co., held Aug. 11, was the Powderly colliery team, with a score of 99.38. The team received the President's Cup from G. B Fillmore, Hudson president, and will be sent to the national first-aid contest in Columbus, Ohio, this October. Team members also received cash prizes of $25 each. Placing second was Pine Ridge colliery, with a score of 99.32, and third was Baltimore colliery with a score of 99.27. Team members received cash prizes of $15 and $10 each, respectively. All three teams will participate in the annual anthracite contest in Wilkes-Barre Sept. 8.

Two W. Va. Companies Honor Mine Supervisors

Presentation of safety awards to supervisory personnel of the Amherst Coal Co. and the Logan County Coal Corp. was the feature of a banquet held by the company June 22 at the Boy Scout Camp, Accoville, W. Va.

W. B. Hayes, superintendent of the Amherst Coal Co., was presented with awards from the Joseph A. Holmes Safety Association and the W. Va. Department of Mines for having mined 4,600,000 tons of coal without a fatality. Similar awards from the two organizations also went to the Amherst Nos. 1A, 1B and 1C mines, for mining more than 1,000,000 tons without a fatal accident; and to the Lundale mine of the Logan County Coal Corp., for a similar record. The Amherst No. 3A mine received an award from the state Department of Mines for having exceeded 1,000,000 tons without a fatality.

The following supervisors were presented with certificates from the National Coal Association for having no lost-time accidents for 1 yr or more: Amherst No. 1A mine, Thomas Weir and Oscar Davis; Amherst No. 4, Roy Dials; Amherst No. 3, Harve Porter and Tom Gilmer; Amherst No. 3C, William Goodman, Russell Gearheart and Golden Copley; Amherst No. 3A, Earl Perdew, Travis Grimmett and Charles Brown.

Latrobe mine, Jess Sias; Lundale, Paul Shafer and Calloway Adkins; Paragon, Ray Propst, Harry Lovejoy and Charles Cole; MacGregor Nos. 2-6-1, C. W Gray; MacGregor No. 2, David Scalf and Wayne Brumfield; and MacGregor No. 6, Challis Workman, Mason White, Pat Jeffrey and James Bevino.

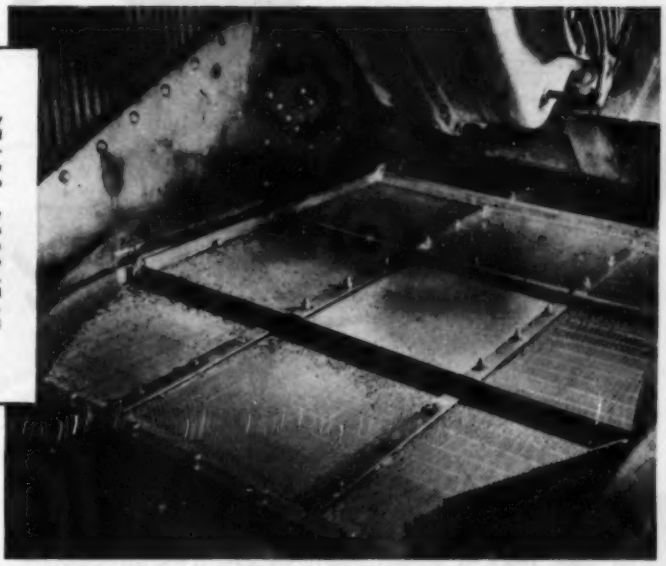
Present for the ceremonies were the following company officials: H. E. Jones Jr., vice president, the late W. W. Beddow, vice president in charge of operations; George W. Jones, su-

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Where other types of screens lasted only a few months at the most, these slotted wedge-type screens of Stainless Steel required no replacements in 14 months' service at Sunnyhill Coal Company's preparation plant at New Lexington, Ohio.

Actual service life will be considerably longer. At the end of 14 months two screens under the coal delivery chute had broken due to impact. Rather than replace the two screens, an entire new deck was installed. Thus 19 of the original 21 screens are still on hand as spares. Judging from their condition, they are ready for many additional months of service.



SUNNYHILL COAL COMPANY has pioneered in taking fullest advantage of the benefits of Stainless Steel in preparation plant service. Double-deck dewatering vibrators at Sunnyhill's New Lexington, Ohio, preparations plant are a good example of the savings that Stainless Steel makes possible by its long service life.

Because of abrasion and corrosion, carbon steel screens in this equipment lasted only a few months at most. And rusting, which resulted in blinding, caused coal to pile up on the deck when operations were resumed after a shutdown.

So Sunnyhill installed twenty-one 2' x 2' slotted wedge-type screens made of Stainless Steel. In 14 months, none of these screens were replaced, although they handled 70,000 tons of coal. Both types 302 and 410 Stainless Steel have performed well in this application.

In addition to service life 5 times that of ordinary screens, these Stainless units were unaffected by corrosion after shutdowns. Consequently, there was no loss of production while screens were wire-brushed and made ready for operation again.

You'll be interested in the complete story of Sunnyhill's experience with Stainless Steel in preparation plant equipment. It's all told in a booklet entitled, "Stainless Steel at Sunnyhill." For your copy, mail the coupon.

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perintendent of maintenance; W. T. Chaney, superintendent, Lundale mine; A. S. J. Hopkins, chief engineer; A. H. Newland, superintendent of maintenance; H. D. Moore, superintendent of personnel; and W. G. Beddow, assistant to the vice president. Guests of the company included: J. W. Colley, secretary, Logan County Coal Operators' Association; Frank Furin, James Whelan, J. C. Muir, H. B. Lynch and Lex Trunko, USBM; and Prentice Farley and Ed Stuckey, W. Va. Department of Mines.

Joint Fuels Conference Offers Full Program

Three panel discussions and one general session on the preparation and use of coal will feature the 14th Joint Fuels Conference sponsored by the Coal Div., AIME, and the Fuels Div., ASME, to be held at the Roanoke Hotel, Roanoke, Va., Oct. 11-12.

The opening panel, to be devoted to thickening and desliming equipment and practice, will include the following discussions: "Operational Data for Cyclone Thickener Operations," J. P. Blair, Heyl & Patterson; "Low-Cost Industrial Desliming of Fine Solids," D. A. Dahlstrom, Northwestern University; "Slurry Thickening With the Stream Cleaner," K. Prins, K. Prins & Associates; "Operational Data for the Locust Summit Breaker," H. R. Hagen, Philadelphia & Reading Coal & Iron Co. Others participating will include John Griffen, McNally Pittsburg Mfg. Corp.; E. B. Nelson, TCI; and Victor Phillips, EG&FA.

Speakers on "Engineering Service in the Coal Industry" at the second panel will be: U. B. Yeager, Island Creek Coal Sales Co.; George P. Cooper, Empire-Hanna Corp.; Max A. Tuttle, Enos Coal Mining Co.; and E. J. Kerr, B&O R.R.

"Fuel and Equipment Consulting Service for Small Steam Generating Plants" will be the topic of the third panel, with the following participating: A. R. Miller, General Foods Corp.; E. C. Payne, Pittsburgh Consolidation Coal Co.; H. C. Carroll, Commercial Engineering & Testing Co.; E. C. Webb, Iron Fireman Corp.; and W. S. Major, Dravo Corp.

The fourth session will feature these papers: "Determination of the Free Swelling Index of Coal Employing Electric Furnaces and Heaters," by E. Swartzman and G. C. Behnke, Canadian Bureau of Mines; "Air Pollution From Gob Piles," Henry F. Hebley, Pittsburgh Consolidation Coal Co.; "Changing Characteristics of Storage Coal," T. F. Downing Jr., Philadelphia Electric Co.; and "Filter Cake Size-Consist and Moisture Relationships," O. R. Lyons, Republic Steel Corp.

Prof. Charles T. Holland, head of the Department of Mining Engineering, Virginia Polytechnic Institute, is general chairman of the conference.



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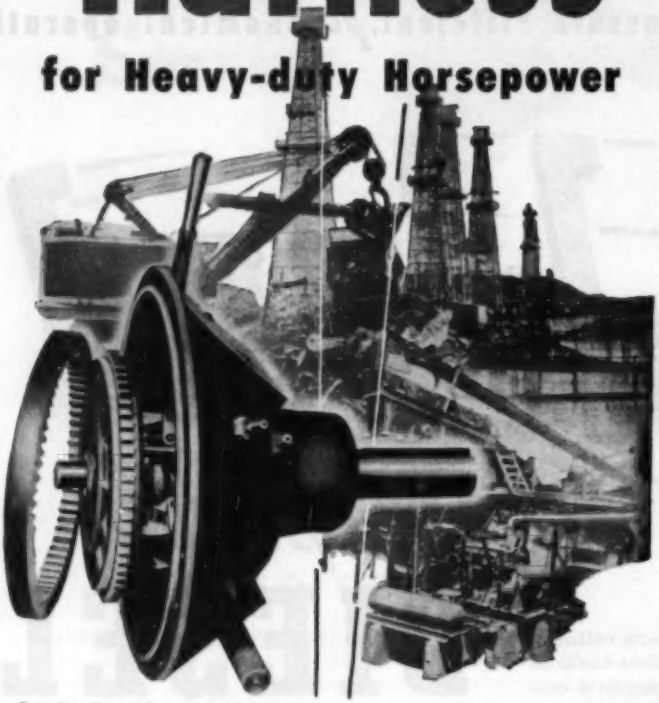
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Preparation Facilities

Valley Camp Coal Co., Mine No. 3, Elm Grove, W. Va.—Shipment by Deister Concentrator Co. of seven additional SuperDuty Diagonal-Deck No. 7 coal-washing tables and one additional Model 108 Concenco revolving feed distributor arranged for seven-way distribution, to clean 5/8x0.

Bethlehem Steel Co., Coke Dept., Johnstown, Pa.—Shipment by Deister Concentrator Co. of six SuperDuty Diagonal-Deck No. 7 coal-washing tables, for cleaning metallurgical coke.

Haven Coal & Supply Co., Schuylkill Haven, Pa.—Shipment by Deister Concentrator Co. of four SuperDuty Diagonal-Deck No. 7 coal-washing tables and one Model 109 Concenco revolving feed distributor arranged for four-way distribution, to clean No. 1 buck, barley and No. 4 buck.

Buckeye Coal & Coke Co., Stephenson, W. Va.—Contract closed with Jeffrey Mfg. Co. for one No. 200 unit washery; capacity, 100 tph, 3x¼.

Woodward Iron Co., Woodward, Ala.—Contract closed with Jeffrey Mfg. Co. for one 3-compartment 8-cell Baum jig; capacity, 260 tph, 3x0.

Gulf Smokeless Coal Co., Tams, W. Va.—Contract closed with Roberts & Schaefer Co. for R&S air-cleaning equipment for cleaning 120 tph of ¼x0 coal; plant to be complete with dust-collecting equipment and all accessories.

Central Ohio Coal Co., Muskingum mine, Unionville, Ohio—Contract closed with Roberts & Schaefer Co. for complete coal-preparation plant consisting of storage bins, Bradford breaker and shipping bins; capacity, 900 tph, ROM; coal to be crushed in Bradford breaker and washed in Jeffrey Baum-type jig.

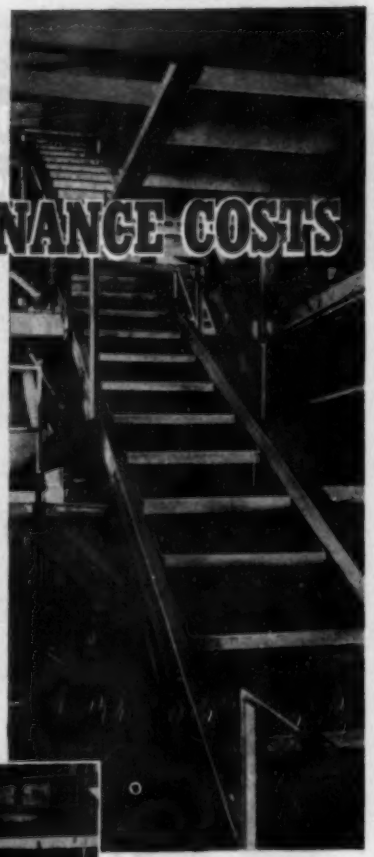
Bethlehem Collieries Corp., Ellsworth, Pa.—Contract closed with Roberts & Schaefer Co. for complete slope and preparation plant; capacity, 750 tph; bottom equipment to consist of car feeder and scales, revolving dump, crusher and slope belt to cleaning plant; coal-washing plant to be complete with Jeffrey Baum-type jig cleaning 5x0 and Bird centrifugal filters for preparing coal for shipment for metallurgical use.

Bethlehem Collieries Corp., Century, W. Va.—Contract closed with Roberts & Schaefer Co. for complete coal-preparation plant; capacity, 200 tph; 5x¼ to be cleaned in R&S Hydro-Separator and ¼x0 to be cleaned in R&S Super-Airflow equipment.

Bethlehem Collieries Corp., Barrackville, W. Va.—Contract closed with Roberts & Schaefer Co. for complete coal-preparation plant embodying crushers, Jeffrey Baum jig and Bird continuous centrifugal drier; to handle 300 tph of crushed ROM coal and produce one size of washed coal, 6x0.

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From Wilmot's Larger Choice of Sizes and Metals You Can Select the Chain Best Suited to Specific Abrasion, Load, Corrosion or Temperature Problems

Obviously the chain that will give the longest trouble-free conveying service is the one whose strength and metal specifications most nearly meet the requirements of its particular job. As shown below, Wilmot furnishes chain in the largest choice of metals and sizes. Thus you can better select a "job-suited" chain which will cut maintenance costs.

Standard Keystone Rivetless Chain

Size	Material	App. Pitch	Ave. Ult. Strength
348	EEE-N-DFR	3"	22,000
348	EEE-HT-DFR	3"	29,000
348	3140-HT-DFR	3"	32,000
348	3240-HT-DFR	3"	34,000
458	EEE-N-DFR	4"	38,000
458	EEE-HT-DFR	4"	50,000
458	3140-HT-DFR	4"	52,000
458	3240-HT-DFR	4"	56,000
458	Chrome-Mang., Cast	4"	40,000
668	EEE-N-DFR	6"	55,000
668	EEE-HT-DFR	6"	75,000
668	3140-HT-DFR	6"	89,000
668	3240-HT-DFR	6"	99,000
668	Chrome-Mang., Cast	6"	80,000
678	EEE-N-DFR	6"	73,000
678	EEE-HT-DFR	6"	98,000
678	3140-HT-DFR	6"	97,000
678	3240-HT-DFR	6"	107,000
678	Chrome-Mang., Cast	6"	85,000
688	EEE-N-DFR	6"	110,000
688	EEE-HT-DFR	6"	124,000
688	3140-HT-DFR	6"	135,000
688	3240-HT-DFR	6"	154,000
698	EEE-N-DFR	6"	124,000
698	EEE-HT-DFR	6"	149,000
698	3140-HT-DFR	6"	161,000
698	3240-HT-DFR	6"	182,000
698	Chrome-Mang., Cast	6"	140,000
998	EEE-N-DFR	9"	124,000
998	EEE-HT-DFR	9"	149,000
998	3140-HT-DFR	9"	161,000
998	3240-HT-DFR	9"	182,000
998	Chrome-Mang., Cast	9"	140,000

Size	Material	App. Pitch	Ave. Ult. Strength
9118	EEE-N-DFR	9"	200,000
9118	EEE-HT-DFR	9"	240,000
9118	3140-HT-DFR	9"	255,000
9118	3240-HT-DFR	9"	290,000
9118	Chrome-Mang., Cast	9"	230,000
9148	EEE-N-DFR	9"	270,000
9148	EEE-HT-DFR	9"	300,000
9148	3140-HT-DFR	9"	345,000
9148	3240-HT-DFR	9"	375,000
9148	Chrome-Mang., Cast	9"	325,000
105208	EEE-N-DFR	10½"	352,000
105208	EEE-HT-DFR	10½"	395,000
105208	3140-HT-DFR	10½"	450,000
105208	3240-HT-DFR	10½"	495,000
105208	Cast Steel	10½"	440,000

N—Normalized
DFR—Drop Forged
Chrome-Mang.—Chrome-Manganese Steel
HT—Heat-Treated

At right and below, 2 of the 15 Wilmot conveyors recently installed in the ultra-modern Leatherwood, Ky., plant of Blue Diamond Coal Co.



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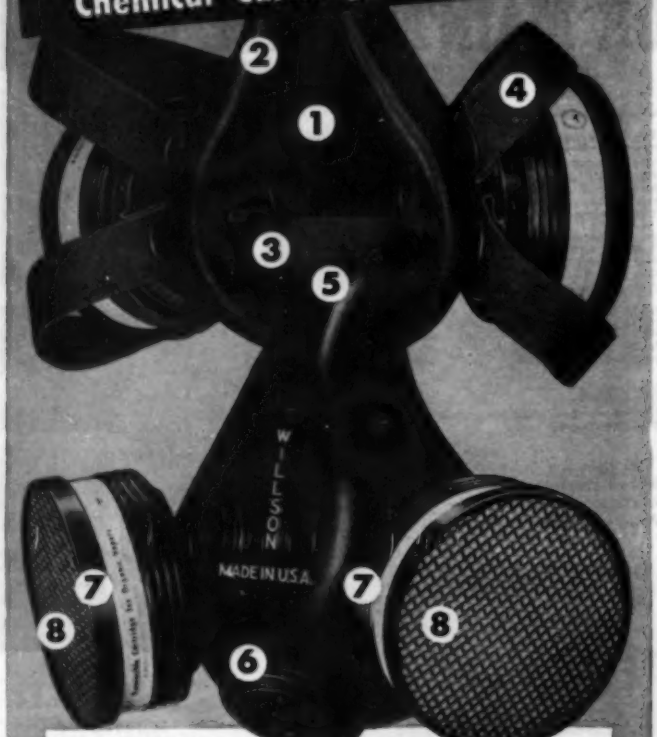
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3. Flexible, molded chin cup—comfortable and secure.
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5. Self-adjusting fit over bridge of nose—without reinforcement.
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New Books for Coal Men

What's What in Roof Support

Questions and Answers on Roof Support in Bituminous-Coal Mines—A Handbook, by J. J. Forbes, Edward Thomas and A. J. Barry. Here's the latest information on roof control, written in simple language and bound in a wear-resistant, pocketsize cover. Besides being a handy reference guide for supervisors and miners, the booklet is useful in training classes and group meetings. Roof control with machine mining gets special stress. The booklet replaces Miner's Circulars Nos. 31 and 40. *25c Supt. of Documents, Government Printing Office, Washington 25, D. C.*

Dust in Continuous Mining

Allaying Dust During Operation of Continuous-Mining Machines in Utah, by W. M. Merritts and T. T. Reay Jr. At Sunnyside Nos. 1 and 2 mines, Kaiser Steel Corp., Sunnyside, Utah, dust produced by continuous miners is allayed by spray nozzles on the cutting and conveyor heads of the machines. The nozzles throw a mixture of water and wetting agent on the coal. This booklet tells how it's done. *USBM, I. C. 7608. 12 pp plus illustrations. 8x10½-in; mimeo. Free, Publications Distribution Section, 4800 Forbes St., Pittsburgh 13, Pa.*

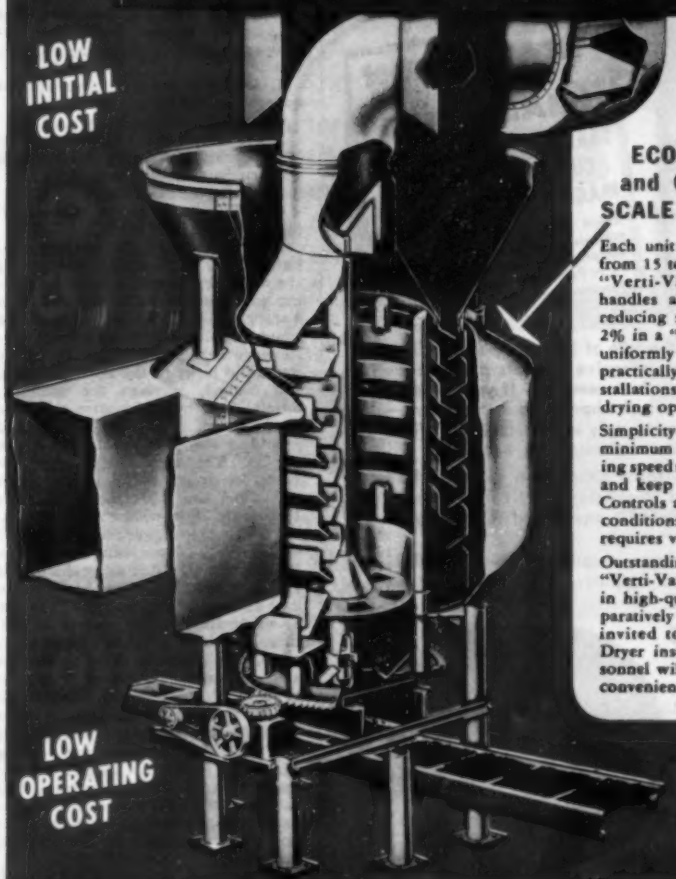
German Shearer

Anthracite Mechanical-Mining Investigations—Progress Report 3: Preliminary Testing of the Korfmann Universal Shearing Machine, Model SK 20, by J. W. Buch and Andrew Allen Jr. This track-mounted, compressed-air shearing machine, developed by the Germans, may become a useful tool in mining steep-pitching anthracite seams and devolping gangways. The Bureau tests, staged in an anthracite mine revealed the machine's power characteristics and its maneuverability and effectiveness. A compressed-air crawler mounting is being designed to improve maneuverability, *USBM, R. I. 4794. 11 pp plus illustrations. 8x10½-in; mimeo. Free, Publications Distribution Section, 4800 Forbes St., Pittsburgh 13, Pa.*

Leader-Training Helps

The Holmes Home-Study Plan, With Texts, Lessons and Examinations by Dexter Kimball, Richard Calhoon, Walter Tann, Donald Laird and others. Training leaders through home-study courses saves money and production time and screens out men without ambition. Though not a substitute for technical on-the-job training, home study does train men to lead, supervise and manage. Cost runs at $50 to $60 per man. Texts and testing materials for the course are published by McGraw-Hill Book Co. Details from *O. D. McKenzie, vice president, Holmes Institute, 16th & Park Rd., Washington, D. C.*

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Verti-Vane THERMAL Coal Dryer

ECONOMICAL, UNIFORM and CONTROLLED LARGE-SCALE DRYING OPERATIONS

Each unit designed for capacities ranging from 15 to 75 tons per hour, the Baughman "Verti-Vane" Thermal Dryer efficiently handles all coal sizes from 1¼" down—reducing surface moisture to approximately 2% in a "one-pass" operation—delivering a uniformly dried and well-mixed product with practically no degradation. Multiple unit installations are recommended for large-scale drying operations.

Simplicity of design, rugged construction, a minimum of moving parts, and slow operating speed tend to eliminate shift break-downs and keep replacement costs to a minimum. Controls are easily adjusted for various feed conditions so that operation of the unit requires very little attention.

Outstanding in price performance, Baughman "Verti-Vane" Thermal Dryers give the best in high-quality drying operation with comparatively low initial cost. You are cordially invited to inspect Baughman Verti-Vane Dryer installations . . . Robert Holmes' personnel will be pleased to escort you at your convenience. Write, wire or phone for details.

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HANDLING run of mine coal at the rate of 350 tons per hour, this STEARNS Magnetic Pulley protects expensive crushers and screens by continuous and automatic tramp iron removal. If you want to reduce shut-down time and keep repair charges to a minimum — install a STEARNS Magnetic Pulley, the only economical and effective insurance against the tramp iron nuisance.

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SMALLEST!

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661 S. 28th St., Milwaukee 46, Wis.

Nova Scotia Society Studies Mining Methods

Begins on p 130

tested and the British Standard proved to be the best and is now standard. It develops approximately the full strength of the rope. Hot metal is taken to the rope locations in special insulated containers. For ropes in remote locations, and particularly where they are small in size, British SS socketing cones are used. These provide, said Mr. Russell, an efficiency of over 95%.

The Dosco Miner

Development of the "Dosco Miner," with particular emphasis on the design of the No. 2, or improved, unit was the subject of F. Doxey, assistant general manager, Dominion Coal Co., Ltd. The new design was developed to meet the following requirements:

1. Ability to cut and deliver coal in quantity and in the proper sizes.
2. Easy maneuverability.
3. Suitability for longwall mining.
4. Operation without interference with timbers already set.
5. Ability to cut its own stable.
6. Ability to work on reasonably heavy grades.

As now designed, the machine consists of a 7-chain mining head, with the necessary hydraulic jacks for raising the head to make the cut, plus a short cross belt for feeding to a face conveyor, all mounted on a front carriage, which is advanced 18 in by hydraulic jacks in the rear, or power and control, carriage for sumping. Special bits, in combination with the head design, eliminate coring and produce a coal with a satisfactory size consist. The new design also provides for access to all parts of the unit from the top. The machine is 15 ft long, 58 in wide and 43 in high.

The machine is working on a 500-ft wall in the Harbour seam in Dominion No. 18 colliery. Pitch along the wall is 17½ deg, or 31%. The best run to date of the meeting was 350 ft in 6½ hr of cutting, for an output of 400 tons. The crew consists of two operators, who alternate; three timbermen and one mechanic. Actual cycle time is 35 to 57 sec, of which sumping 18 in and cutting to the top requires 14 to 23 sec. In other words, this is the actual production time during which the production rate is approximately 8 tpm. To handle coal at this rate, a special flat-belt face conveyor has been installed. It is expected to improve the output of the machine materially.

With Dr. A. Stanley Walker, president, Kings College, Halifax, N. S., as the principal speaker, the annual banquet also featured an address by Alex H. McKinnon, Nova Scotia Minister of Mines and Labour, and membership awards as follows:

Honorary membership—Harry J. Kelle, Sydney, N. S., former Dosco

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COALMASTER SPIR-L-WELD AUGER



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- The Buda Co. Harvey, Ill.
- Diamond Supply Co., Inc. Evansville, Ind.
- Dooley Brothers Peoria, Ill.
- Drillmaster Supply Co. Evansville, Ind.
- Illinois Powder Mfg. Co. St. Louis; Salt Lake City
- Joy Manufacturing Co. Main Office, Pittsburgh, Pa. Subsidiaries and representatives in 57 countries
- Mobile Drilling, Inc. Indianapolis, Ind.
- Salem Tool Company Salem, Ohio

Write for New Coalmaster Catalog

Coalmaster Drill Bits, **of special analysis steel, cut faster . . . stay sharp longer . . . slash power consumption to a minimum.**

Coalmaster Hexanspeed Assembly, **above right, is a full-proof, automatic coupling that speeds up auger changing — and increases productive time at the bore hole.**

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This 8-wheel DIFFERENTIAL MINE LOCOMOTIVE is no ordinary piece of motive power. It has AXLESS trucks! Therein lies the difference between a royal ride and a regular ride.

We can't do it justice here but, in substance, this feature means greater speed with no sacrifice of safety. Means greater adhesive capacity per pound of weight. It also means better roadability and less wear and tear on both wheels and rails. Users appreciate the simplified design which means easier servicing.

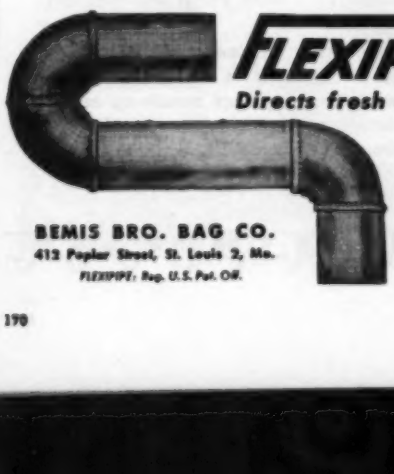
It all adds up to more tons of coal transported per dollar invested in haulage equipment and per dollar spent for maintenance. Think this over! Send for Bulletin D-32 for complete specifications.

Differential Products Include: Locomotives, mine cars, mine supply cars, rock larries, mantrip cars, air dump cars, dumping devices and complete haulage systems.

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Nova Scotia Mining Society . . .

vice president and general manager, proposed by Mr. Anson.

Life membership—John Bernard Petrie, New Victoria, N. S., who retired as mechanical superintendent of the Wabana operations in 1949, after 63 years with Dosco and predecessor companies.

Rock-Drill Bits

Development and use of tungsten-carbide rock-drill bits was discussed by J. C. Heaslip, manager, Detachable Bit Div., Canadian Ingersoll-Rand Co. Ltd., to start the technical sessions July 13, Mr. Goudge presiding. Making the cutting elements detachable, said Mr. Heaslip, an event of approximately 15 yr ago, was a major step forward, with additional significant progress through the development of tungsten-carbide tipping, starting in Germany about 1932.

Carbide tipping, Mr. Heaslip pointed out, has these advantages: gage retention up to 100 to 400 ft, compared to 18 to 30 in with steel; lighter drilling units; ability to shoot with smaller-diameter holes, which now appear to give significantly better results; reduction in drill maintenance; reduced explosive cost; better footage than with heavier drills and steel bits; less air for drilling; negligible gage loss; longer retention of bit sharpeners; footages up to 100 times those with steel bits; better drilling in slips and faults; greater air or water velocity; ability to use light metals in drill construction; faster shaft sinking; ability to muck, drill and shoot on the same shift; adaptability to big-hole drilling; and increased overall economy.

Carbide bits are now available, Mr. Heaslip reported, in diameters up to 9 in for quarrying operations. When such bits are first introduced, he recommended that tight supervision be exercised and all concerned be posted on the proper care and the procedure to be used for best results.

Hoist Move

How a 1,250-hp underground hoist at Dominion 1-B colliery of the Dominion Coal Co., Ltd., was replaced by transferring a newer 1,800-hp hoist from another location in the mine was the subject of a description by A. MacDonald, 1-B manager; S. McLean, Dominion mechanical superintendent; and D. McFadgen, field staff, Dominion engineering department. The move was a result of a decision to concentrate mining in one slope rather than two to simplify transportation and colliery operation.

The work was preceded by several months of careful preparation and was accomplished during the period of the miners' holiday. Starting Friday, July 28, the work was completed in 22 days 6 hr and 45 min, and the mine resumed operations 25 days after cessation of production. Among other things, the motor haul to the hoisting shaft was reduced 1½ mi.

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RUBBER TIRES add new mobility

The CLARKSON
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Never before has an automatic loader offered such simplicity of operation. The Clarkson operator easily handles *all* controls hydraulically from one central point . . . just one 50 H. P. motor powers the entire loader. No troublesome differential . . . front and rear conveyors and front head provide new flexibility for those hard-to-reach places. Write for the complete facts today.

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Nova Scotia Mining Society . . .

The move was handled by a force of 150 men. Minimum clearance for transportation was 5 ft 8 in, and special low-bed trucks were built to handle the larger parts, with individual loads ranging up to 10 tons. Except for some minor adjustments, the hoist operated successfully from the first day it went back into service.

Award of the John T. Ryan Memorial Trophy to Princess colliery of Old Sydney Collieries, Ltd., for the best safety record in 1950, was a feature of the luncheon meeting July 14. The trophy was presented by Mr. Burchell and was accepted for the colliery by L. J. MacDonald, manager. Princess colliery previously had received the Dominion trophy also for its 1950 record.

Geology and Mining

How the geological aspects of the Sydney coal field affect mining operations was the theme of the concluding technical session. The discussion was led by Dr. T. B. Haites, Geological Survey of Canada, with Dr. L. J. Weeks, also of the Survey, presiding. From the geological standpoint, Dr. Haites stated, the two main conditions affecting mining are structural and sedimentary in nature, and it is necessary to know the specific condition involved in taking care of difficulties in mining.

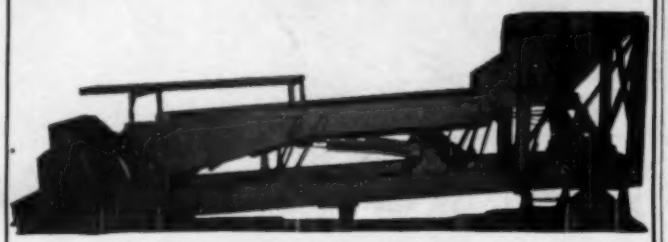
Coal seams and adjacent members in the Sydney area, he believes, were laid down in a flood-plain environment, with the old river channels and meanders showing in the seams. Partings between the main and rider seams increase toward the river channels, thus providing a hint as to where to look for the old channels, though exact prediction still is difficult.

From the standpoint of thickness, the thicker areas of coal roughly coincide with the present synclines and vice versa, with these synclines and anticlines representing more exaggerated stages of the warping present when the coal measures were laid down. Consequently, in looking for new reserves of minable thickness, or in planning projection into new areas, the presence of synclines and anticlines is one indication of the conditions that may be found.

Sulphur and ash content apparently reflect, Dr. Haites tentatively concludes, water penetration of adjacent areas during deposition. Consequently, higher sulphur and ash logically can be expected where water penetration was greatest, in turn depending on whether the area was inside or outside an old river bend. Analyses of seam samples seem to prove this point.

Thrust faults in present workings in the Sydney field are rather small.

PORTABLE
COAL PREPARATION UNITS



(Patent Pending)

• Comprised of hopper, feeder, screen, picking table and single roll crusher. Capacity—125 or 150 tons per hour. Large heavy-duty Timken double-row roller bearings in the eccentrics and pillow blocks. Over-size Torrington spherical roller bearings in the crusher. The crushers are adjustable from ¾" to 10" opening. Screened coal over the picking table is diverted by a flap-gate to the crusher or mixed with the slack for mine-run. The screen has a snappy action, resulting in efficient screening.

The picking table has a smooth motion which allows selective picking of the impurities which are disposed of in the trough running over the center of the picking table.

The unit is equipped with magnetic starters and push-button controls, 10 to 15 HP motor on the crusher, 5 HP motor on the screen and picking table. It can be readily transported from one location to another on a standard long-wheelbase truck, with minimum cost for moving and erecting.

When used in conjunction with a belt or chain conveyor, the unit can be adapted to various arrangements for handling the coal from the trucks or mine cars, through the cleaning unit, to the railroad cars or bins.

The use of oversized anti-friction bearings throughout these two unit sizes insures trouble-free operation, with low power and maintenance costs.
Full information upon request.

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Cross section at left shows how KLEENSLOT SCREENS operate on a non-clogging, non-blinding principle.

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are the last word in efficiency of operation. Long life, precision workmanship and low cost make these screens the definite leader in the field.

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step up your output

of premium size coal



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In mine after mine, Red Crown Class A Permissibles have proved their ability to produce more lump coal, less slack, and bring down a greater tonnage of coal per pound of explosive used!

These are patented, Class A Permissibles—unique in the underground mining field. They detonate with a s-l-o-w, heaving action that results in breakage very nearly equal to that obtained with black powder. In either firm or friable structure, Red Crown shears the ribs clean, yet does not severely shatter the coal in the vicinity of the hole. Lumps are firmer, contain fewer pin cracks . . . there's less degradation from mine to consumer.

PROVE THESE RESULTS BY HAVING RED CROWN DEMONSTRATED IN YOUR MINE

A trial in your mine, under your actual operating conditions, is the best way to show you that Red Crown gives superior results. We will be glad to demonstrate Red Crown in your mine, at your request. Just say the word to your King Powder representative, or phone or write us direct. You'll profit by arranging that demonstration date, today.

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1. Red Crown is easy on the roof.
2. Slow heaving and spreading action with results similar to those obtained with the use of black powder.
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4. Coal displaced in firm, hard lumps means less degradation.
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IN BOTH HIGH AND LOW COAL

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A COMPLETE LINE OF TROLLEY MATERIAL FOR EVERY MINE

Nova Scotia Mining Society . . .

The displacement is toward the older strata and, consequently, larger faults might be expected in the direction of this older strata. Clay gashes in some collieries apparently followed and were a result of thrust faults, which permitted shale to flow into the ruptured areas and form the gashes. Where sandstone top is found, gashes seem to disappear. They also seem to occur more often in the thinner seams and the preferred direction is along the cleats of the seam.

In reply to a question, Dr. Haites said that although it had been considered that the Sydney area was a basin in itself, there was a possibility that the field might be larger than had been assumed.

Open-Pit Meet Reviews Electrical Problems

Begins on p 132

by fused circuit breakers, he explained.

Showing how his company seeks vital information about plant requirements before proceeding with design and cost estimates, Mr. Pate displayed standard data sheets to be filled in by coal operators. With this information, the company can make its estimates and recommendations and can suggest one or more of several standardized electrical layouts based on the required horsepower to be installed in the new plant. Standardized layouts for plants ranging from 112 to 800 hp, 1,200 to 1,800 hp, and 1,800 to 2,400 hp may be obtained upon written request to McNally Pittsburg, Mr. Pate said.

Sequence Control

Electrical sequence control in the preparation plant of Morgan Mines, Inc., Herrin, Ill., was described by George J. Reynolds, electrical and preparation engineer. The system involves the interlocking of all units in successive operating order so that each unit can be started only in its order of sequence and only if its preceding unit has been started. Mr. Reynolds' paper, presented earlier at the annual meeting of the Illinois Mining Institute, was reported in the January, 1951, *Coal Age*.

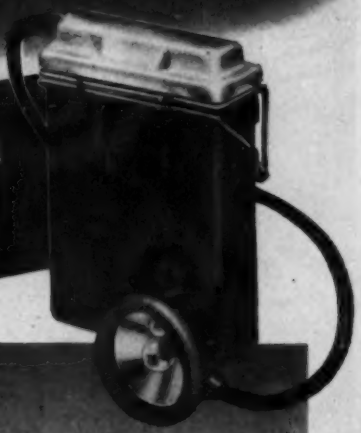
Lightning Protection

Lightning creates special hazards in open-pit mining, said A. M. Opsahl, Westinghouse Electrical Corp., E. Pittsburgh, Pa., whose paper opened the afternoon session. Much open-pit equipment is portable and without driven grounds, and grounding conditions may be bad at those locations where grounds are driven. Citing some general averages on frequency and power of lightning strokes, Mr. Opsahl said that strokes to the earth's surface occur at the rate of about 10 per square mile per year and that an isolated 100-ft-high building or shovel on level land might be hit once in 3 to 7 yr. Direct-stroke currents meas-

IN *Kentucky, Illinois and Indiana*

the trend is to

WHEAT



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Borderland Collieries Company
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Citation Coal Company
Clear Branch Mining Company—2
D. J. B. Collieries, Inc.
Diamond Elkhorn Coal Company
Elkfoot Mining Corporation
Elkhorn & Jellico Coal Company
Feds Creek Coal Company
Garrard Coal Company
Harold Fuels, Inc.
Inland Steel Company—8
Jewell Coal Corporation
Kanawha Coal Company
Kentland-Elkhorn Coal Co.
Lick Fork Coal Company
Mary Gail Coal Company
Morgan Coal Company
New Big Creek Mining Company
New Hyden Coal Company
Pond Creek Pocahontas Company
Pound Mill Coal Company
Pruden Coal & Coke Company—3
Stoker Coal Company
Southern Kentucky Coal Company
Semet Solvay Division, Allied Chemical & Dye Corporation
Sammons Construction Company
Turner Elkhorn Coal Company—2

Western Kentucky

Bassett Coal Company
Caney Creek Mining Company
Crescent Coal Company—2
C. & P. Coal Company
Charleston Sixth Vein Collieries
Dawson Collieries, Inc.
Dawson Daylight Coal Company
Franklin & Sons Coal Company
Lavada Coal Company
Miners Coal Company—2
Magnolia Mining Company
Roberts Bros. Coal Company
Syers Coal Company
Walker & Sons Coal Company
West Kentucky Coal Company

Illinois

Bell & Zoller Coal & Mining Co.—2
Blaine Coal Company
Crab Orchard Coal Company
Freeman Coal Mining Co.—3
Golden Rule Coal Company
Little Dog Coal Company
Mid-Continent Coal Company
Peabody Coal Company
Virden Mining Company
H. B. Wilson Coal Company

Indiana

Buck Creek Coal Company
Ingle Coal Corporation
Princeton Mining Company
Rosehill Coal Company
South Linton Coal Company
Sunshine Coal Company
Viking Coal Company

NOTE: The figure after the company name indicates the number of mines using Wheat Lamps.

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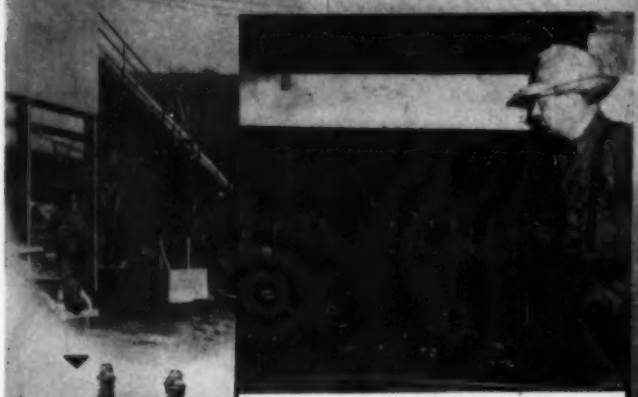
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Syntron Picking Tables, used throughout the Coal Mining Industry, raise the efficiency of a process where a hand-picking operation is the most economical.

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Coal preparation affords a wide scope of applications for the easily adaptable Syntron Equipment. In Coal Preparation Plants, Syntron Equipment supplement each other in the coordinated step-by-step processing of run-of-mine coal. **Syntron Vibrator** on surge bin insures steady, dependable supply to the vibrating grizzly. **Syntron Vibrating Grizzly** provides coarse sizing operation and variable controlled flow to the picking table. **Syntron Vibrating Picking Table** moves large chunks forward, smoothly and evenly, for easy hand picking and to the crusher for reduction. **Syntron Vibrating Screen,** supplied from the grizzly and the crusher, sizes the coal. **Syntron Vibratory Feeder** feeds the sized coal in a gushing torrent or a trickling dribble to driers or loading chutes.

WRITE FOR CATALOG DATA

SYNTRON COMPANY
875 Lexington Homer City, Pa.

ured in tall structures and high-voltage transmission lines average about 15,000 amp with a maximum of 160,000 amp. Lightning-arrester discharge currents average about 1,500 amp with maximum of 35,000 amp.

To protect strip-mine equipment, overhead lines, cables and m-g sets in shovels and draglines, Mr. Opsahl recommended the following:

1. **For transformer substations** all grounds should be tied together and all electrical circuits leaving or entering the station should be equipped with lightning arresters tied between the live conductors and the interconnected grounds. Thus the voltage difference across the electrical insulation will be limited to safe values by action of the arresters. The general and preferred practice is to tie the primary lightning-arrester ground lead to the transformer secondary neutral conductor at the transformer. The transformer tank also should be tied to this ground. The interconnections may be made either solid or through gaps.

2. **Overhead lines** can be protected against direct strokes by overhead ground wires. The fourth or neutral wire should be on top to provide a direct path to ground. Clearance from the down lead to line conductors should be as great as possible. General practice is to provide a ground at each structure.

3. **Metal-sheath or shielded cables** have capacitance enough to make the cables somewhat self-protecting if a low surge of short duration travels to a long cable over an overhead line. In such instances, the surge builds up by successive reflections so that an arrester on each end of the cable effectively limits the maximum voltage. But a high surge near the cable entrance can build up to a high enough voltage to flash over the cable at that point. A lightning arrester connected between each cable conductor and sheath limits the voltage to safe values.

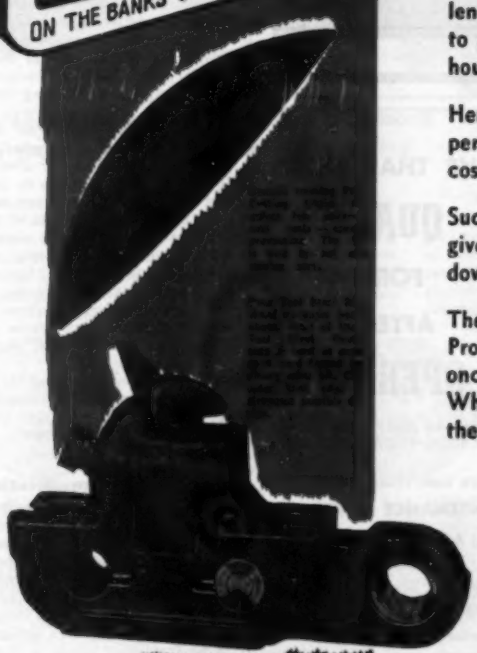
Cables without metal sheath or shielding are subjected to the voltage as limited by the arrester plus the IR drop in the ground resistance of the arrester ground. When the unsheathed cable touches ground or water, the voltage appears between the conductors and the outside of the cable. Protection of this cable insulation is dependent on low ground resistance for the cable-entrance arrester. Since the shovel arresters discharge over the cable conductors toward the line, sending the surge voltage in reverse, the resistance of the shovel to ground and the lightning current determine how high the voltage rises on the cable insulation.

4. **Rotating machines** need special protection. To limit the voltage from winding to frame and to slope off the steepness of the surge-wave front, Mr. Opsahl suggested a circuit in which a line arrester takes the brunt of the surge and limits the voltage. This lim-

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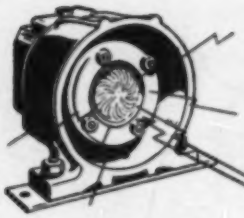
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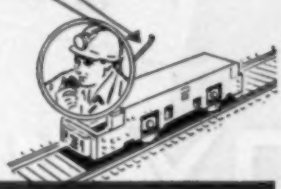


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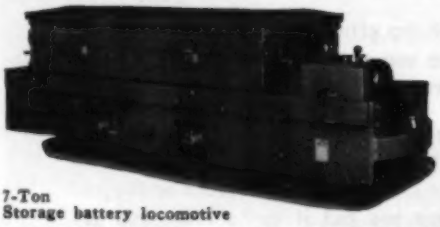
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Open-Pit Electrical Division . . .

ited voltage of steep front is applied to the machine and a parallel capacitor through an inductance, slowing the rate at which surge voltage can build up on the machine winding. Even so, the voltage across the machine will oscillate. To limit the voltage to a safe value, a special low-characteristic arrester is connected in shunt with the machine. The capacitor and machine arrester are tied to the shovel frame. Any combination of inductance and capacitance that will slope off the wave front to 10 microseconds to arrester sparkover will give satisfactory reduction in turn-to-turn voltage stress.

5. Especially vulnerable locations may be protected from strokes by a mast or masts with overhead wires between them. There should be 6 ft or more between the mast ground and other grounds. A single mast will protect equipment within a cone the radius of which is one or two times the height of the mast. Between two masts, objects below the peak of the masts by about one-tenth the spacing between the masts will be fairly well protected.

6. The voltage rating of an arrester should be equal to or greater than the power voltage that can appear from line to ground across the arrester under any steady state or fault condition. Delta-connected and star-connected circuits with resistance or reactance grounding of the neutral require arresters rated above line-to-line voltage.

7. If a shovel standing on rock is struck by lightning, men on the ground near or below the shovel are subject to shock by the gradient along the ground or even by direct sparks if they are near enough to the shovel, but men in the shovel are reasonably free from shock because of the many conducting paths in the shovel frame.

Concluding, Mr. Opsahl said that where grounding conditions are bad, apparatus can be protected by tying the lightning arrester from live conductor to apparatus frame and that men are safer in the shovel than standing near by.

In discussion following Mr. Opsahl's paper, doubts were expressed that interconnection of arresters and equipment grounds would provide adequate protection for personnel.

Strip-Mine Communications

Efficient communication is an ever-increasing factor in successful management of heavy mobile equipment, said V. S. Anderson, Motorola, Inc., Chicago. The Federal Communications Commission, recognizing the need for faster communication in industrial operations, recently has assigned more radio-frequency bands to this purpose and manufacturers have made more equipment available, he said. Coal strip mines are licensable under the Industrial Div., FCC, and that agency is attaining speed in granting licenses. With the latest types of radio

Enthusiastic Users Praise Its Great New Lubrication Savings!

Bearing Life on Shaker Screens Extended!
Roller bearings at Mine "A" lasted only 3 months. Now—with Oil-Mist—no failure for almost 13 months!

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- Prevention of product spoilage.
- Substantial reduction in the number of oils needed.

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speed production

Unexcelled for screening and dewatering coal, Hendrick Flanged-Lip Screens are furnished with short, medium or long slots, in a wide range of sizes of openings.

Short slots are recommended for the most accurate sizing; medium slots for coals which fracture in cubical or spherical shapes, long slots where coal is free from long, slabby, and large, flat pieces. The staggered slots, tapered in direction of flow, are practically non-clogging and the flange at the end of each slot aids in producing faster and cleaner separation.

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1876—Seventy-Fifth Anniversary—1951

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Open-Pit Electrical Division . . . for mobile equipment, two-way communication over 30 mi or so is possible between a fixed station and a mobile unit; between one mobile unit and another, about 3 mi. Latest equipment is compact and portable.

The newest development for industrial radio communication is microwave, which is designed for point-to-point fixed-station use, Mr. Anderson said. Since microwaves follow the line of sight, relay stations must be erected for long-distance communication. Against telephone costs of $1,200 per mile, plus cost of right-of-way costs and the cost of stringing lines over rough terrain, microwave radio costs only $800 per mile for the same service. One Indiana operator now is using microwave for conversations between his city office and his mine, which is some 20 mi distant.

Automatic Field Control

Savings in power bills, reduction in voltage variation and the possibility of using less expensive motors are three of the advantages of using automatic field control, said R. B. Moore, General Electric Co., who discussed his company's Amplidyne controls on motors installed on heavy pit equipment. The power factor of a synchronous motor depends upon the field excitation; that is, for a given reactive load, there is a change in the horsepower load, or vice versa, he explained. Automatic field control regulates the field excitation to hold power factor fairly constant.

In one instance, he pointed out, automatic field control cut voltage variation from 23% down to 8%. In fact, Mr. Moore said, with variable power factor and automatic field control, motor voltage can be held to a variation of as low as 1%. Since automatic field control creates more current-carrying ability at peak loads, large voltage swings characteristic of heavy shovels and draglines need not cause synchronous motors to fall out of step and fall.

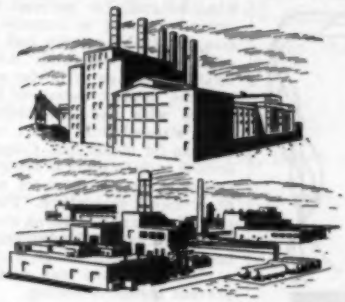
Listing some of the advantages of automatic field control, Mr. Moore cited the following: (1) improvement in load factor and reduction of cost; (2) improvement in pull-out torque of synchronous motors; (3) reduction of light flicker; (4) elimination of excessive over-voltage on light work; (5) reduction of heating of synchronous-motor fields; and (6) reduction of cable heating.

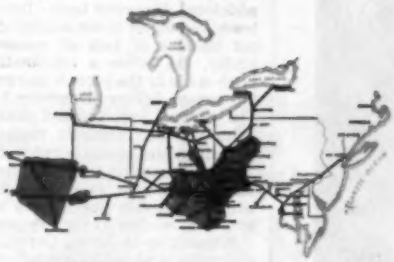
Electrical-Parts Directory

The electrical directory of open-pit mining equipment, unveiled by John Huey, electrical engineer, United Electric Coals Cos., Chicago, lists Bucyrus-Erie, Marion, General Electric and Westinghouse electrical installations for strip mining and catalogs large revolving electrical spares. Machines are grouped according to manufacture, models in numerical order and electrical manufacturers. Though small spare parts are not listed, the list of



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you need a machine with plenty of strength and power—able to drill 3" holes (2⅛" core) to depths of 500 ft. or more, using a Series M Double-Tube Core Barrel. THEN you'll get good cores from coal or shale or any kind of rock.

Equally effective for drilling to depths of 1000 ft. or more (with progressively smaller holes and cores) the MODEL 40-C embodies all of the good features that have made Sprague & Henwood Core Drilling Machines the choice of many mining companies for many years. Rugged construction, alloy-steel parts and anti-friction bearings throughout, permit long periods of trouble-free high-speed core drilling at minimum expense. Bulletin 185 gives complete information. Write for it if you're interested in better cores at lower cost. No charge or obligation.



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See Telephone Directory for Local Distributor or write Durakool, Inc. Elkhart, Indiana

Send for Bulletin 800

Open-Pit Electrical Division . . .

large spares will serve as a guide in seeking a probable source for small spares.

Mr. Huey explained that the directory is not a spare-parts pool and the listing is no guarantee that the desired parts can be secured. The directory does provide a starting point for inquiries if parts are needed in an emergency. Arrangements for purchase or loan must be made on an individual basis. The directory is a cooperative project designed for mutual help in keeping open-pit mining machines in operation. One copy is provided free to each member of the association. Extra copies are available at $3 each from L. E. Briscoe, association secretary-treasurer, Fairview Collieries Corp., Indianapolis.

Briquetting Group Views Industry Progress

Begins on p 134

discussion, with opinion on the former to the effect that other factors might be more important, and on the latter that uniformity was the critical factor. The adverse effects of long fluxing, it was brought out, probably were a result of degradation, increasing the surface to be covered by binder.

Past experience and future prospects in binderless briquetting was another discussion topic. Closing down of a binderless plant in western Canada designed for railroad fuel but instead diverted to domestic production, resulted from the fact that degredation was excessive. Actually, a small percentage of binder was used, and the product seems to have improved with age. In addition, the small size—slightly over 1 in—is attractive for stoker use. Consequently, serious consideration is being given to reopening on the basis of no binder or a small percentage. For stoker operation, particularly, on chain-grate equipment, a 3%-binder briquet has been found good, though a change to a clamshell shape was necessary to prevent excessive rolling.

Briquetting of lignite char was an additional discussion topic. Density is lower because of lower density of char, not because of lack of pressure or binder, the latter a combination of pitch made in the process and asphalt. Percentage figures given were 8 to 10. The product has excellent characteristics for the domestic market. In general, where binder is reduced, feeding more material increases the pressure and results in a good briquet with comparable degradation results with coal or char as the raw material.

Briquetting in Japan, Germany and Australia is aimed at producing ordinary briquets, smokeless briquets or binderless briquets, reported Lajos Szeszich, technical adviser, and Charles C. Boley, coal preparation technologist, Natural Resources Section SCAP, Japan, in a paper read by

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specify the wire rope that gives the greatest service. "HERCULES" (Red-Strand) *Preformed* spools more evenly —bends more smoothly. Handles more safely. Splices more easily. Far fewer replacements are needed.

Engineered to reduce internal tension and twisting, "HERCULES" (Red-Strand) *Preformed* stays on the job—*in* the groove.

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Adaptable to most locomotives. Motorman can adjust brakes quickly—anywhere at any time—with grease gun using any standard grease. No threads to rust, strip, or wear . . . no chance of sudden release of braking power. Available in any length from 10" rod centers up. Can be furnished with tubular grease extension for closed type frames.



MESCO Shock Absorber

"Dead ends" cables and allows for slack when connecting cables to junction boxes or other sources of power. Spring takes up sudden jerks which might snap cable. Equipped with four bolt clamp (illustrated) for use on shuttle cars, or with hinge type clamp for use on other mine machinery. Can be securely bolted to roof or chained to timbers or rail. Recommended for use on electrical, hydraulic, or clutch driven reels.



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Large motor, to assure more horse power per ton weight of locomotive.

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This locomotive being used for main line haulage at the Blacksmith Coal Company, Novinger, Missouri. This is a 4½ ton locomotive, operating on 30" gauge track. This locomotive built from 3½ to 10 tons — either single or double motor drive — 16" to 56½" track gauge.

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Briquetting Conference . . . . .

Theo. L. Johnston, Natural Resources Research Institute, Laramie, Wyo.

For making ordinary briquets, Japan and Germany use, or have used, coal-tar pitch, but in Germany particularly, the cost has resulted in a search for substitutes, and, in Japan, the use of emulsions. Pitch substitutes proposed or used include: sludge heated with tar, creosote oil or pitch oil; coal-hydrogenation residue; bakelite-type plastics; sulphite liquor; and viscose. In Japan, by increasing the binder, good briquets are made with very wet coal, while briquetting with special equipment and 3% binder has given good results in Germany. In Germany, also, standardization is almost complete both as to processing and equipment.

Large smokeless briquets made of smokeless coal and smokeless binder are a major product for household use in Japan and, in the opinion of the authors, could find a place in the U. S. Both Germany and Australia, using special presses, including a new ring-roll type, produce large quantities of binderless briquets from brown coals and lignite, and experiments are being carried out in Japan.

Briquetting machinery for coal and other materials was discussed by Paul Haigh, vice president, Komarek-Greaves & Co., Chicago, to start the second session, with E. Swartzman, engineer, Canadian Bureau of Mines, presiding. The roll-type press is the most efficient. The press is the heart of the process, but pre-preparation is the most important for best results.

Discussion emphasized the need for a good strength-comparison test for pillow-shaped briquets, though it was brought out that the standard Komarek-Greaves test has value in this respect if properly carried out.

Quality Control

Specific gravity as a guide to briquet quality was discussed by L. W. Corbett and F. B. Odasz Jr., asphalt research chemist, Husky Oil Co., Cody, Wyo., and Mr. Miller. The discussion was presented by Mr. Corbett. The investigation was made by taking random samples at two plants and selected samples at a third. These were tested for specific gravity, percent voids and Komarek-Greaves compression to learn if there was any relationship between the tests, to study their variation, and to choose, if possible, the most precise test, with the intent of recommending it for quality control. It was learned that the specific-gravity test was the most precise and that there was no relationship between the Komarek-Greaves test and either of the other two. The work indicated the desirability of quality control tempered by field observations.

Size consist of the coal, it was brought out in discussion, is an important influence on density, though opinion also was expressed that in some instances density was not great-



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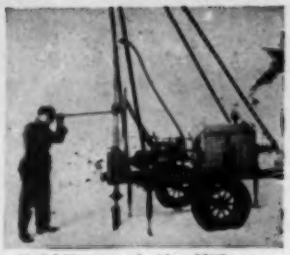
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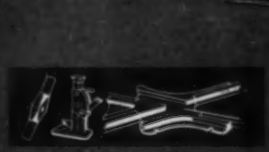
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ly influenced. Ash content also has a major influence on specific gravity.

Emulsion Binding

Briquets bound with a sulphite liquor-asphalt emulsion seem to offer definite advantages as a result of tests by the Natural Resources Research Institute, Mr. Rice reported. The binder proportions are 3 to 4% asphalt and 5 to 6% sulphite liquor. In addition to giving a briquet with excellent qualities, the process offers possibilities of low-temperature operation, thus simplifying final cooling and processing.

Results of laboratory and commercial trials of spent sulphite liquor-asphalt emulsions as binders at plants of the C. Reiss Coal Co. were presented in a paper by A. J. Wiley, technical director, and Bernard Van Camp, research chemist, Sulphite Pulp Manufacturers' Research League, Inc.; M. F. Kummer, Reiss general superintendent; and C. R. Faulkender, technical director, Hoberg Paper Mills, Green Bay, Wis., who read the paper.

Using formulas developed by the research institute, the league and paper mill carried out both commercial trials at the Reiss plant and laboratory and pilot-scale work in cooperation with Komarek-Greaves. Coal briquets with excellent qualities have been produced, and standards for high early-strength have been developed. From the cost standpoint the emulsion binder seems to offer good savings in areas close to paper mills.

Discussion included methods of dust-proofing, which brought out the fact that both dilute solutions of water glass and feeding of soft paper into the presses have been successful.

"The best way to increase business is to make a better product," declared C. W. Link, manager, briquet department, Berwind Fuel Co., Superior, at the conference dinner, Mr. Richter acting as toastmaster. Discussing the briquetting process and briquetting materials phase by phase, Mr. Link also contended that only the best grades of fuel should be used, since the briquet is only as good as the material in it.

How flash drying can serve the briquetting industry was detailed by C. W. Gordon, manager, Flash Drying Dept., Combustion Engineering-Superheater, Inc., Chicago, in opening the final session Aug. 3, with J. M. Moore, plant superintendent, C. Reiss Briquet Co., Ashland, Wis., presiding. Describing the principles and operaton of the flash dryer, Mr. Gordon stated that operaton at the plant of the Kuesel Coal Co., Milwaukee, has shown these advantages (1) close control of final moisture; (2) safe over-drying if necessary to drive off treating oil on the coal; (3) short starting up and shutting down time; (4) minimum space requirements; and (5) nominal operating and maintenance costs.

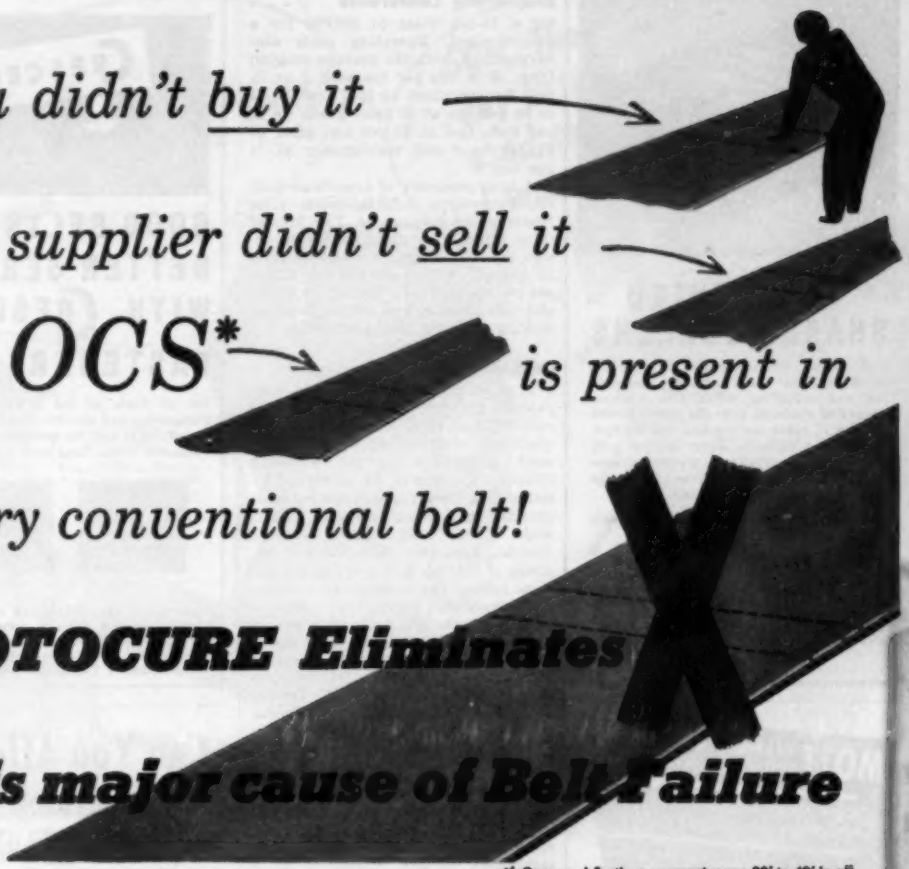
Though cautioning that they vary widely, Mr. Gordon stated that average installed costs range from $43,000

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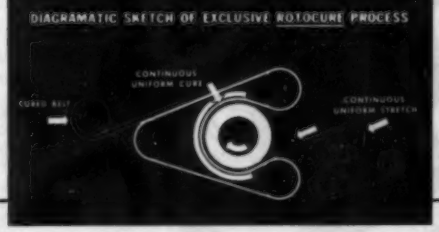
Many of the premature failures of conventionally-made conveyor belts can be attributed to *overcured* or *double-cured* segments of 2' to 4' wide across the entire belt. These "Achilles Heels" occur every 30 to 40 feet and cannot be eliminated in conventional or flat press curing because the earlier cured sections in this "stop and go" operation move forward *less than a full press length* each time.

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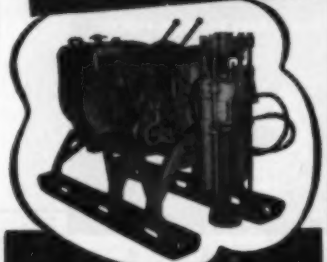
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Briquetting Conference . . . . .

for a 15-tph plant to $80,000 for a 50-tph plant. Operating costs also vary widely, with the average ranging from 17 or 12c per ton with 1 or ½ men for operation, 15 tph, down to 11 or 9c per ton at 50 tph—power as 1c per kwh, fuel at $3 per ton, labor at $2 per hour and maintenance at 1c per ton.

A brief summary of experience with the Parry-type fluidized-solids drier featured the discussions. The first of three units is handling double its design capacity, reducing moisture from 10 to ½% with good control. Gases are recirculated continuously. In a second unit, dust is bled off for heating, making the unit self-sustaining.

Coal Balling

In an attempt to achieve a pea-sized product for domestic-stoker use and railroad fuel at a cost less than briquetting, coal-balling experiments were undertaken by the Research Council, University of Alberta, declared J. L. Carveth, assistant research chemist, in a paper prepared jointly with W. A. Lang, senior research chemist, Edmonton, Alta. Balling consisted of mixing coal and asphalt and then rolling the mixture in a drum. The experiment proved that coal balls with desirable characteristics can be made, but that with the quantity of binder required—8 to 9%—the cost is high. There is reason to believe, however, that it can be reduced by further study and modification of the process.

Lignite Utilization

Dakota lignite was successfully used to reduce briquetted iron ore to metallic iron in experiments carried out by C. V. S. Ratnam, Hyderabad, India, reported Alex S. Burr, chief, fuels technology division, Region V, U. S. Bureau of Mines, Grand Forks, N. D. As a result, Mr. Burr declared, Mr. Ratnam developed a reduction process that probably will solve Indian problems and may have application in the future in the United States.

Results of experiments in the gasification of lignite were outlined to conclude the conference by W. H. Oppelt, chemical engineer, and M. H. Chetrick, gas specialist, U. S. Bureau of Mines, Grand Forks. It was emphasized that the goal was a gas that could be used for synthesis and the production of hydrogen—in other words, a chemical material. The raw material is Dakota lignite and the product is water gas with a Btu content of 275 to 300. Yields range from 51,000 cu ft per ton with 82% carbonization down to 35,000 cu ft with 54% carbonization. Estimated costs are 52 to 58c per MCF for a plant with a capacity of 1 million cubic feet per day, and 30 to 33c for a 10-million cubic feet plant. This cost is not competitive with fuel-gas prices, it was brought out, but is low enough, it is felt, to make the gas suitable as a chemical raw material in certain regions.



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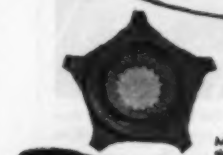
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The Cincinnati Duplex Chain with the Duplex Bit is recommended for maximum cutting efficiency. The block and connector are drop forged of high grade alloy steel, carefully heat treated and scientifically engineered to withstand hard usage.

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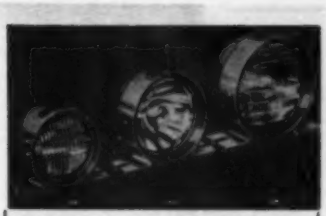
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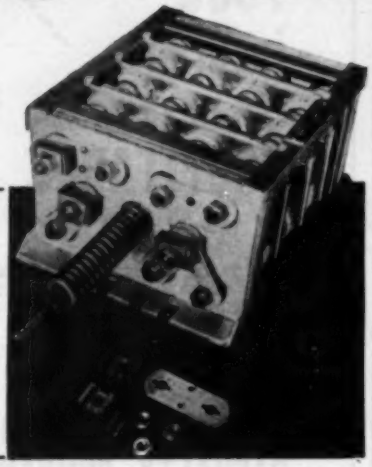
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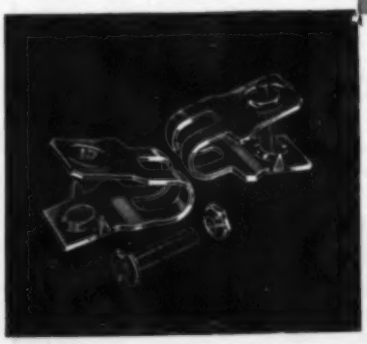
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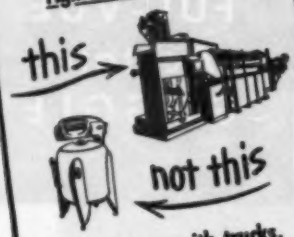
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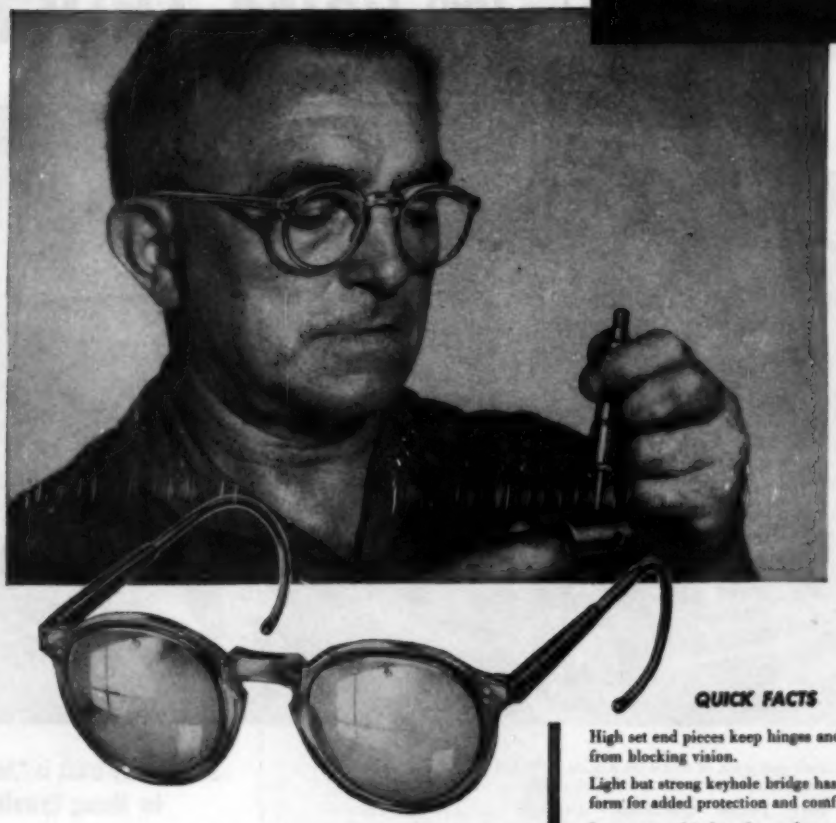
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This Safer Cable

will help you win the Coal War



Winning the battle of production in the coal fields requires tough machines like this Jeffrey Loader — and *safe cables* to keep them rolling.

The reason, no doubt, why top manufacturers of mining equipment consistently wire with Rockbestos A. V. C.® — good reason, too, why A. V. C. is the best cable for you to use when rewiring is necessary.

Rockbestos A. V. C. is specifically built to stand up under severe mining service—insulated with non-burning asbestos, impregnated with heat and moisture resisting compounds, then wrapped with dielectrically strong varnished cambric. It's the *safe* cable that stands up under heat from overloads — won't ignite, burn or carry flame.

So, to keep your maintenance costs down, always specify A. V. C. for new machines — always use it for rewiring older ones.

ROCKBESTOS PRODUCTS CORPORATION
NEW HAVEN 4, CONN.

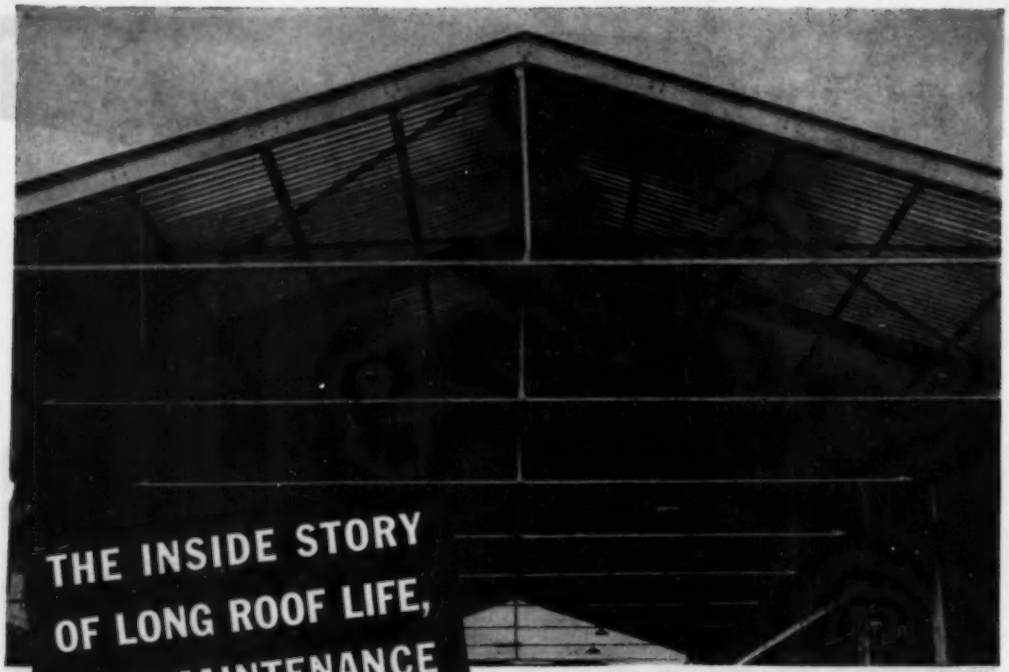
NEW YORK CLEVELAND DETROIT CHICAGO PITTSBURGH
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ROCKBESTOS A.V.C.
has a HIGHER AMPERE RATING

ORDER FROM THESE JOBBERS—SPECIFY "ROCKBESTOS A.V.C."

BECKLEY, W. VA.: National Mine Service Co.
BIRMINGHAM, ALA.: Moore-Handley Hdwe. Co.
BLUEFIELD, W. VA.: Superior-Sterling Co.
CHARLESTON, W.VA.: Charleston Elec. Supply Co.
CLARKSBURG, W.VA.: Westinghouse Electric Supply Co.
CLEVELAND, OHIO: Upson-Walton Co.
EVANSVILLE, IND.: Evansville Elec. & Mfg. Co.
FAIRMONT, W. VA.: Fairmont Supply Co.
HUNTINGTON, W. VA.: Banks-Miller Supply Co.
JENKINS, KY.: National Mine Service Co.
LOGAN, W. VA.: National Mine Service Co.
LOTHAIR, KY.: Mine Service Co.
MIDDLESBORO, KY.: Regan & Regan Co.
PITTSBURGH, PA.: Upson-Walton Co.
Westinghouse Elec. Supply Co.
SCRANTON, PA.: Penn. Elec. Engineering Co.
WHEELING, W. VA.: Westinghouse Elec. Supply Co.
WASHINGTON, PA.: Fairmont Supply Co.
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THE INSIDE STORY OF LONG ROOF LIFE, LOW MAINTENANCE

When the Sturtevant Air Handling Division of Westinghouse Electric Corp. planned a new warehouse at Hyde Park, Mass., they found they could save substantially on framing by using this strong *yet light* aluminum roofing. Weight is only 56 lbs. per square—see specifications for load-carrying capacity.

Ease of application further lowered initial cost. And the company looks forward to years of *minimum maintenance* with the rustproof, corrosion-resistant metal that needs no painting.

Workers will also find summer temperatures cooler under heat-reflecting aluminum...and lighting will be better under this bright ceiling. In *your* next building these two advantages may be even more important. In *any* building the rustproof permanence of aluminum must save you money.

For literature, technical assistance and application details, call on Reynolds.

• Offices in principal cities. Check your classified phone book for our listing under "Building Materials," or write: Reynolds Metals Company, Building Products Division, 2005 South Ninth St., Louisville 1, Ky.

Aluminum is required for planes and other military needs. Reynolds *Lifetime* Aluminum Industrial Corrugated is still produced, but the total supply is necessarily reduced. DO-rated orders receive priority handling.

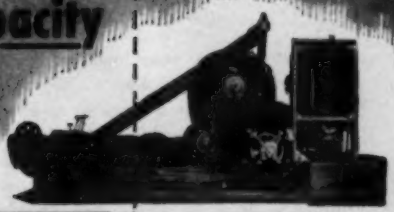


Specifications for Reynolds *Lifetime* Aluminum Industrial Corrugated:

- Thickness .032"
- Corrugations 7/8" deep, 2-2/3" crown to crown
- Uniform load support (roof) 80 p.s.f. on 4' purlin spacing
- Uniform wind load capacity (siding) 20 p.s.f. on girt spacings up to 7'9"
- Roofing width 35", coverage 32"
- Siding width 33-3/4", coverage 32"
- Lengths 5', 6', 7', 8', 9', 10', 11', 12'

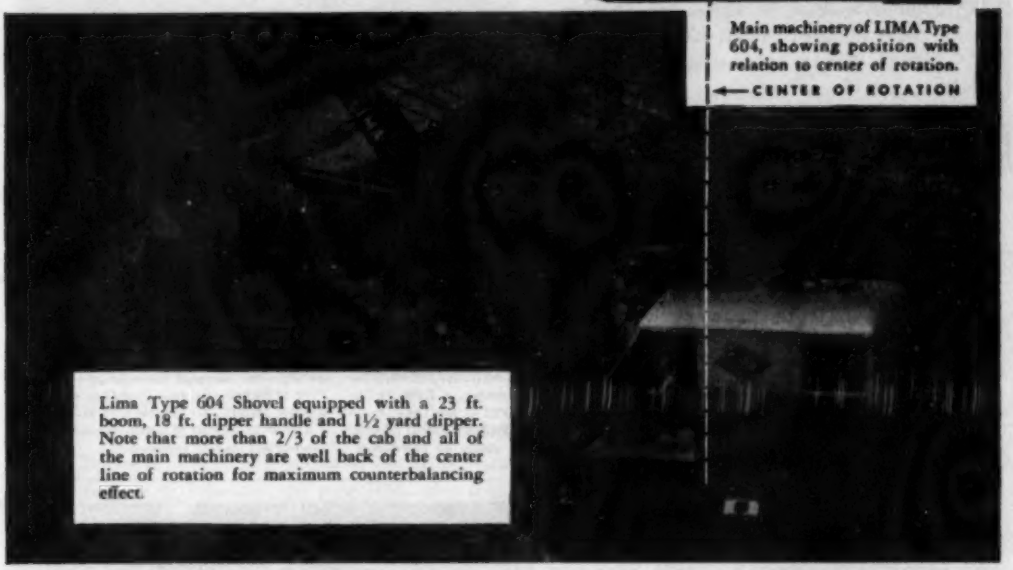
REYNOLDS *Lifetime* ALUMINUM INDUSTRIAL CORRUGATED

Why the LIMA Type 604 develops the greatest capacity per lb. of weight



Main machinery of LIMA Type 604, showing position with relation to center of rotation.

←CENTER OF ROTATION



Lima Type 604 Shovel equipped with a 23 ft. boom, 18 ft. dipper handle and 1½ yard dipper. Note that more than 2/3 of the cab and all of the main machinery are well back of the center line of rotation for maximum counterbalancing effect.

● The LIMA Type 604 shovel, crane and dragline is engineered to produce greatest capacity with minimum weight. This is achieved by placing as much weight as possible *behind* the center of rotation—eliminating the need for excessive counterweight. Hook rollers on which the machinery base revolves eliminate strain from the center pintle—permitting continuous, safe operation at full capacity.

The simple, compact design of the main machinery, using the fewest number of shafts to accomplish the various operations, further contributes to efficient, trouble-free service.

These are only a few of the features which make the LIMA 604 a favorite with owners and operators. The Lima Line includes shovels ¾ to 6 yards, Cranes 13 to 110 tons and Draglines variable.

BALDWIN-LIMA-HAMILTON CORPORATION
LIMA-HAMILTON DIVISION
LIMA, OHIO, U. S. A.

BALDWIN BLH LIMA-HAMILTON

SALES AGENTS IN PRINCIPAL CITIES OF THE WORLD

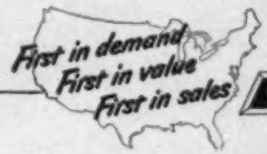
BALDWIN-LIMA-HAMILTON

Stronger . . . safer . . . and money-saving, too!

CHEVROLET Advance Design TRUCKS

Strength to carry your loads . . . power to *move* your loads and *keep* moving them . . . extra features that add up to more service, safety, operating comfort and economy! These new Chevrolet trucks offer you more of the things that count on the job . . . more of the money-making, money-saving features you want and need on jobs that test a truck's real value. Check what Chevrolet trucks offer and see for yourself. Valve-in-head engines that squeeze more power from every drop of gas. Self-energizing brakes for extra stopping power—greater safety. Wide-base wheels for increased tire mileage. These new Chevrolet trucks even offer extra driver comfort—with new cab seats and Ventipanes. But learn all the facts now. See the new Chevrolet Advance-Design trucks at your dealer's today.

CHEVROLET DIVISION OF GENERAL MOTORS, DETROIT 2, MICHIGAN

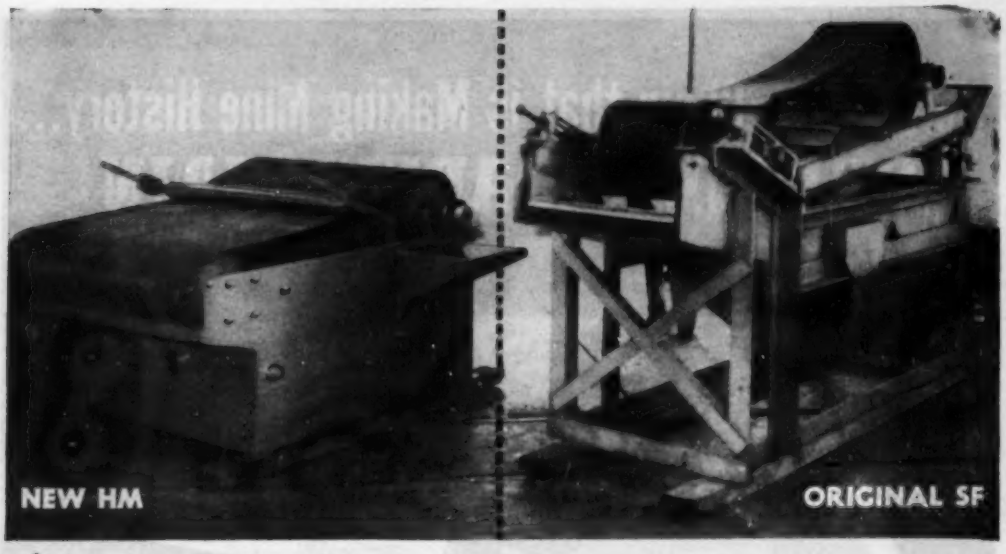


CHEVROLET

ADVANCE-DESIGN TRUCK FEATURES

TWO GREAT VALVE-IN-HEAD ENGINES—the 105-h.p. Loadmaster or the 92-h.p. Thriftmaster—to give you greater power per gallon, lower cost per load • POWER-JET CARBURETOR — for smooth, quick acceleration response • DIAPHRAGM SPRING CLUTCH—for easy-action engagement • SYNCHRO-MESH TRANSMISSIONS — for fast, smooth shifting • HYPOID REAR AXLES—for dependability and long life • NEW TORQUE-ACTION BRAKES—for light-duty models • PROVED DEPENDABLE DOUBLE-ARTICULATED BRAKES — for medium-duty models • NEW TWIN-ACTION REAR BRAKES — for heavy-duty models • NEW DUAL-SHOE PARKING BRAKE —for greater holding ability on heavy-duty models • NEW CAB SEATS—for complete riding comfort • NEW VENTIPANES — for improved cab ventilation • WIDE-BASE WHEELS—for increased tire mileage • BALL-TYPE STEERING—for easier handling • UNIT-DESIGN BODIES—for greater load protection • ADVANCE-DESIGN STYLING—for increased comfort and modern appearance.





Heavy Media Recovery Improved 9 Ways

DINGS TYPE HM CROCKETT SEPARATOR RECOVERS 99.8%, IS SMALLER, LIGHTER, COSTS LESS*

THE heavy media concentration process** is coming into its own. A big reason why is the economical recovery of medium pioneered and brought to peak efficiencies by the Dings Crockett Separator. Now—in the type HM—this separator has been greatly improved. Recoveries are even higher—99.89% in at least one case—and its operation is virtually foolproof. It will pay potential and current users of the heavy media process to investigate the type HM fully.



AIEE Paper on Heavy Media Process Available Free

Co-authored by K. A. Blind of Dings and J. J. Bean of American Cyanamid, this 9-pg. paper will be of considerable help to anyone interested in the potentials of the Heavy Media Process. Write:

DINGS MAGNETIC SEPARATOR COMPANY
4720 W. Electric Ave., Milwaukee 46, Wis.

IMPROVED FEATURES OF DINGS TYPE HM CROCKETT

1. Incorporates 6 magnet poles compared to 8. Purity of concentrate remains the same; recoveries are considerably improved.
2. New design permits lower cost.
3. Floor space reduced 53%; head room reduced 34 inches.
4. Magnetic intensity increased 15%.
5. New undershot feed arrangement provides greater medium recoveries.
6. Side overflows eliminated; this product now discharged adjacent to the tailings valve. No piping is needed.
7. Sealed self-aligning ball bearings on head and tail pulleys.
8. New self-adjusting belt tightener.
9. Integral tank and frame assembly permits standardization irrespective of head room requirements.

DINGS SEPARATORS HAVE BORNE AMERICAN CYANAMID COMPANY'S APPROVAL FOR OVER 10 YEARS.

Dings Magnets

*Dings Mag. Sepr. Co. is the only manufacturer licensed to build the Crockett Magnetic Separator.

**The Heavy Media Separation Processes are licensed by American Zinc, Lead and Smelting Co. American Cyanamid Co., 30 Rockefeller Plaza, New York 20, N. Y., are their sole technical and Sales Representatives for these processes.

Here is the Chain that is Making Mine History...

WHITNEY LOADER CHAIN



Ever since it was first introduced, Whitney Universal Joint Mine Chain has been making mine history. The reason . . . by reducing loader down time, cutting costs and simplifying maintenance.

Whitney Universal Joint Mine Chain is *specifically* designed for loaders — from ruggedly designed flights to alloy steel chain parts, it is engineered to withstand the severest operating conditions in underground service.

But that's not all . . . Whitney Loader Chain further reduces operating costs because it permits on-the-job chain repairs. All you need is a wrench, hammer and a few sections of packaged chain and flight assemblies. There is no lost time taking the loader to the repair shop. It stays up-at-the-face getting out coal.

It will pay you to investigate Whitney Mine Chains today. Get in touch with your local Whitney Distributor. He will show you the many exclusive features which make this chain the solution to your drive problems. Or, write us for catalog and complete information on this Mine-Engineered Whitney Loader Chain!

WHITNEY CHAIN COMPANY
218 HAMILTON STREET, HARTFORD 2, CONN.

IT'S PACKAGED TOO! The chain sections and flight pitches are carefully packaged at the factory for protection. The tough, sealed box keeps out moisture, dirt and dust . . . assures proper prelubrication. All the elements required to assemble Universal Joint Mine Chains are contained in small, easy-to-handle cartons. Cartons conserve storage space — permit shelve stocking — provide accurate inventory control. Clearly labeled with prominently featured part numbers, permits easy, correct selection of chain.

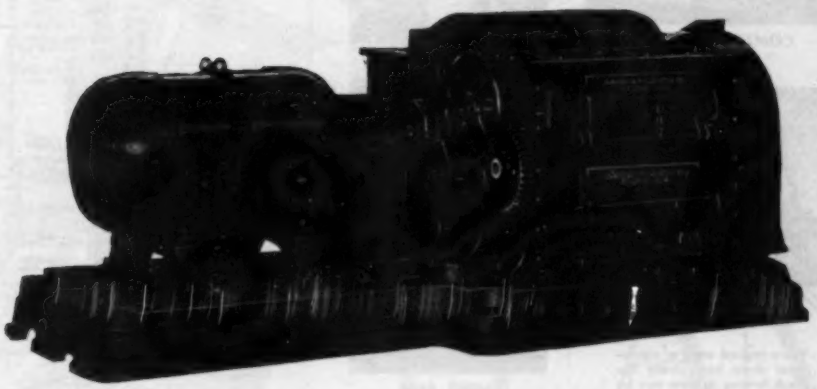
When You Figure

COST PER TON

The Best Answers Come From

American

COAL CRUSHERS



Lower Repair & Maintenance Costs. **Here are actual case histories:**

- ***4,000,000 tons of coal crushed at a parts replacement cost of only $.0005 per ton,*** **in ten years of operation at Illinois coal mine.**
- ***10,008,000 tons for less than $.0008 per ton,*** **in last ten years at industrial power plant in West Virginia.**
- ***6,000,000 tons in 20-year period for only $.00025 per ton,*** **at central station in New Jersey.**

Longer Life, Lower Depreciation. **Many 20-year old Americans are still in active operation.**

Lower Power Needs. **American's exclusive patented Shredder Rind Crushing Principle permits slower speeds, resulting in new savings in power costs.**

CRUSHES COAL FOR LESS THAN 1¢ PER TON**—including Depreciation plus Maintenance plus Power plus Interest on Investment.**

WRITE for complete literature on American Crushers.

WRITE for Bulletin "CRUSHING COAL AT LESS THAN 1¢ PER TON"

American **PULVERIZER COMPANY**

Originators and Manufacturers of Ring Crushers and Pulverizers

1119 Macklind Ave.
St. Louis 10, Mo.

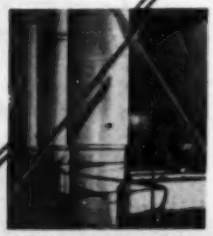
C-E RAYMOND

Flash Drying

OFFERS NEW ECONOMIES IN THE PREPARATION OF FINE COAL SIZES



CONTROL PANEL



DRYING COLUMNS AND WET FEEDERS

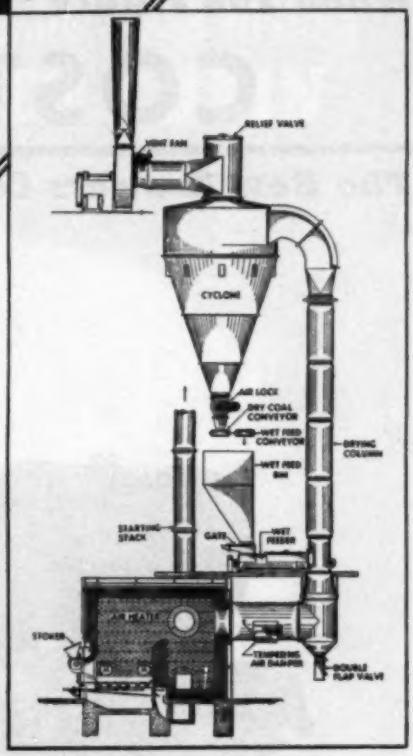


COAL HOPPER FOR SPREADER STOKER



VENT FAN

These typical units of equipment show how easily the Flash Drying System can be fitted to any plant.



FLEXIBILITY—An advantage of the Flash Drying System is its ready adaptability to any plant layout. The individual units of equipment with connecting piping and collectors can be placed on one or more levels and arranged to fit into your present plan of material handling.

CAPACITY—The C-E Raymond System provides maximum efficiency and economy in drying fine coal in a size range of ⅜" x 0". It is built in several different capacities. A single drying column has a range of 10 to 75 tons per hour. Multiple columns may be connected to a single furnace for still higher capacities.

MOISTURE RANGE—This type of equipment will handle initial surface moisture up to 12% without recirculation. With recirculation, there is no upper limit to initial moisture handled, and 25% to 30% is a common requirement. With final moisture content ranging from 0% to 3%.

OPERATING ECONOMY—The easy control, automatic operating features and low upkeep, make the C-E Raymond System an efficient and low-cost method of preparing fine coal sizes.



For complete details, write for your copy of this Flash Drying Booklet.

COMBUSTION ENGINEERING-SUPERHEATER, INC.

FLASH DRYER DIVISION, 1315 North Branch St., Chicago 22, Illinois

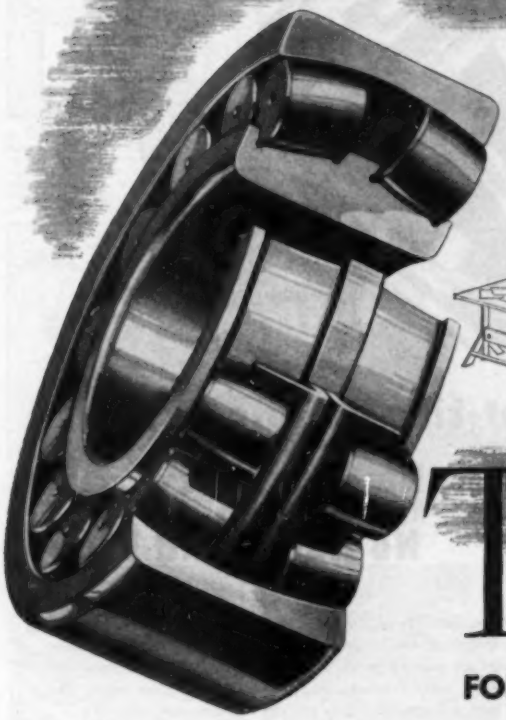




DESIGN ENGINEER
MINING EQUIPMENT



SKF
BEARING
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TEAM

FOR EFFICIENCY AND ECONOMY

Over the years, SKF engineers have worked closely with engineers and designers in every field of industry. This co-operation, this *team-work*, has helped industry minimize friction in all types of equipment from the smallest motors to the largest blooming mills. Whether you are designing new equipment or looking for efficient, economical replacement bearings, look confidently to SKF for expert, proved advice. Depend on SKF to help you put the right bearing in the right place. 7270-D

SKF
BALL AND ROLLER BEARINGS

8 REASONS WHY SKF IS PREFERRED BY ALL INDUSTRY

integrity • craftsmanship • metallurgy
tolerance control • surface finish
product uniformity • engineering service
field service

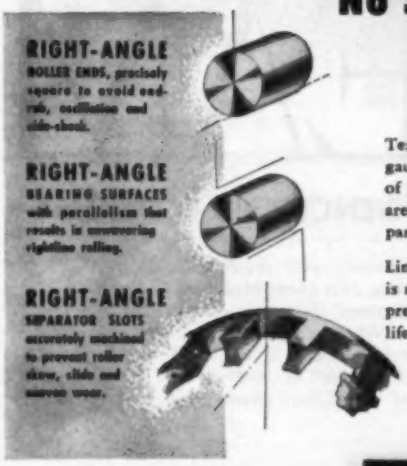
SKF INDUSTRIES, INC., PHILADELPHIA 32, PA.—*manufacturers of* SKF *and* HESS-BRIGHT *bearings.*



Unwavering Right-Line Rotation...

No Skew...No Side Shock...

No Roller End Drag



Test Rollway Maximum-Type Cylindrical Roller Bearings with your finest gauges. Notice that the bores are precisely cylindrical and that the surfaces of the separators are parallel to each other. The roller ends themselves are truly square on every diameter, and the bearing surfaces match the parallelism of both the separator slots and the roller races.

Line for line and surface for surface, each maximum-type Rollway Bearing is a beautiful piece of related precision and right-angle trueness. Each is precision-engineered for quieter running, lower friction losses and longer life-expectancy under specific conditions of maximum service.

Our engineers will gladly help you select bearings for particular applications. No cost. No obligation. Just write Rollway Bearing Co., Inc., Syracuse 4, N.Y.

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PHILADELPHIA BOSTON
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CLEVELAND DETROIT
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ROLLWAY BEARINGS

Complete Line of Radial and Thrust Cylindrical Roller Bearings

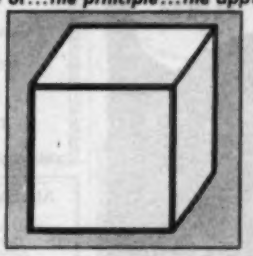
FLOTATION RECOVERY OF COAL FINES

the Principle... Application... Results

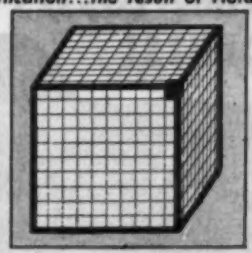
Because "Froth Flotation" is a relatively new process in coal preparation, the Denver Equipment Company presents here a picture story of...*the principle*...*the application*...*the result* of Flotation recovery of coal fines.



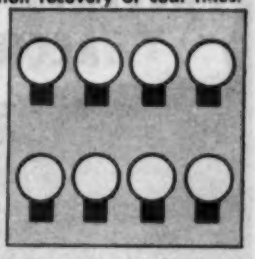
In 1903 it was discovered that bubbles would pick up chemically coated particles of mineral in a weak acid pulp and carry them to the surface. This selective mineral recovery principle is now used to recover fine particles of coal from high ash content wastes.



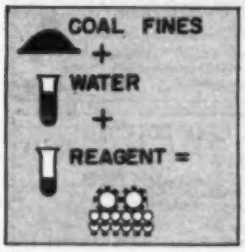
Bubble structure is important because small bubbles expose greater surface area for attracting coal than do large bubbles. Smaller bubbles have added strength and lifting power. Compare bubble to cube. A 1" cube has surface area of 6 square inches.



Same 1" cube, when divided into 1000 1/10" cubes has total exposed surface area of 60 square inches compared to only 6 square inches of original 1" cube. Result is greater available surface area for attracting and lifting fine particles of coal to surface.



A 1" cube of coal, broken to pass through 10 mesh screen would have similar increase in surface area. Increased surface area of bubbles attracts and carries fine particles of coal to surface. Coal particles 1/8" to 0" respond best to flotation.



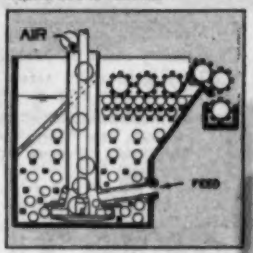
Coal fines are pulped with water. Reagents, usually kerosene or fuel oil, are added. Reagents affect coal differently than waste ash or gangue. Coal becomes "filmed" with reagents... waste does not. Bubbles are created which attract and adhere to coal fines.



A chemical attraction between bubbles and reagent coated coal fines causes bubbles to attract and collect coal. Waste, not being coated with reagents, is not collected by bubbles. Photo by H. Rush Spedden is enlarged 83 times, shows small bubble carrying load.



Enlarged photograph of several bubbles carrying particles to surface. Addition of pine oil or other froth producing reagent often aids in creating smaller more active bubbles which have greater attraction to the reagent coated particles of fine coal.



Flotation machine consists of tank to contain coal pulp, mechanism for agitating and creating bubbles, method of removing coal froth and means of disposing of tailings or waste. Over 33,000 Denver "Sub-A" Flotation Cells are serving the world around the world.



Typical coal froth on standard Denver "Sub-A's" recovering coal fines from waste material. Froth flotation is recognized as best method for recovering coal fines at low cost. Method is used extensively in Europe, Africa, South America...as well as U.S. and Canada.



Most coal is recovered in standard Denver "Sub-A's." Special conditions have resulted in special machines such as this one with deep digging froth removal rakes which remove and partially dewater the large volume of coal fines prior to drying for market.



Floating coal. Costs of recovering marketable product from coal wastes already at surface range from 20c to 50c per ton of recovered coal. Flotation feed comes from slurry water, silt, sludge, waste dumps, middlings, coal dust and high-ash mine-run coal fines.



Laboratory testing of coal fines accurately tells percentage, ash content and best method of recovery. Facilities at Deco's Coal Testing Division are available to any firm seeking to improve over-all net recovery of marketable coal. Write for details.



DENVER EQUIPMENT COMPANY
1402 SEVENTEENTH STREET • DENVER 17, COLORADO

PUBLICATIONS AVAILABLE

• The complete story of Denver "Sub-A" Flotation appears in a new bulletin No. F10-829. This bulletin together with other technical publications of value to Coal Preparation Engineers will be sent to you without cost or obligation. Please check below.

- ☐ Denver "Sub-A" Flotation (No. F10-829)
- ☐ Coal Flotation (Bulletin F10-820)
- ☐ Coal Flotation at Pittsburgh Coal Company (Bulletin F10-814)
- ☐ Coal Flotation at Sloss-Sheffield (M4-852)
- ☐ Coal Flotation at Lehigh Navigation Coal Co. (Bulletin M6-854)
- ☐ Denver-Dillon Vibrating Screens
- ☐ Denver Spiral Rake Thickeners
- ☐ Denver Adjustable Stroke Diaphragm Pump
- ☐ Denver Vertical Sand Pump

Name_____

Title_____

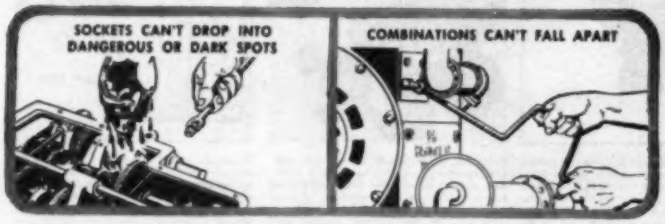
Company_____

Address_____

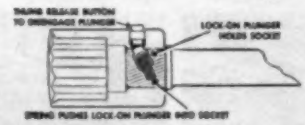
THIS "LOCK-ON" IDEA PREVENTS TIME LOSSES AND ACCIDENTS!



More and more safety and efficiency men throughout the coal industry insist on Socket Wrenches having the "Lock-On" feature. They gain extra safety and speed, yet the price is no greater.



UNLIKE ORDINARY WRENCHES—Blackhawk Socket Wrenches for general work do not have friction-ball or set-screw gripping devices. The exclusive Blackhawk "Lock-On" feature (right) prevents sockets from sticking in tight places or dropping off accidentally. Yet, "Thumb Release" disengages combinations quickly.



NEW! MILLWRIGHT ASS'T

Put new flash and action into maintenance and construction work. Equip your men with this big selection of multi-utility Blackhawk Socket Wrenches. Their polished chrome plating is easily spotted in dark places. Socket sizes range from ⅜" up to 1⅜".

Over 50 carefully chosen tools in a sturdy, steel case.



A product of Blackhawk Mfg. Co., Dept. W4591, Milwaukee 1, Wis.

BLACKHAWK

Hydraulic Jacks • "Porto-Power" • Wrenches

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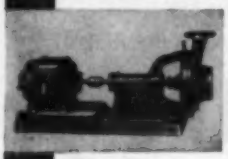
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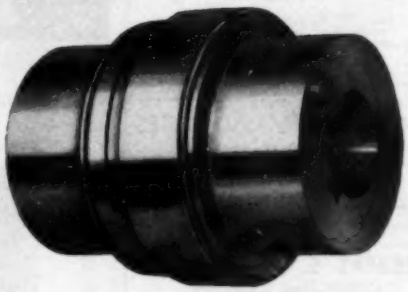
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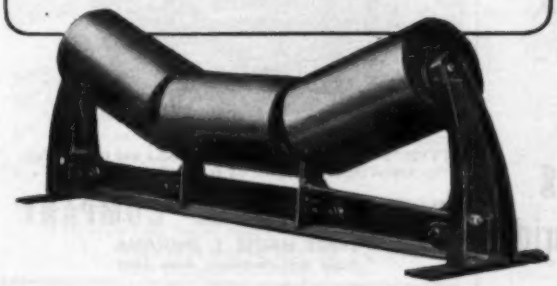
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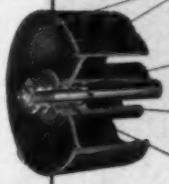
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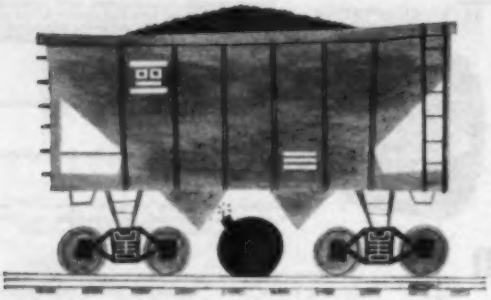
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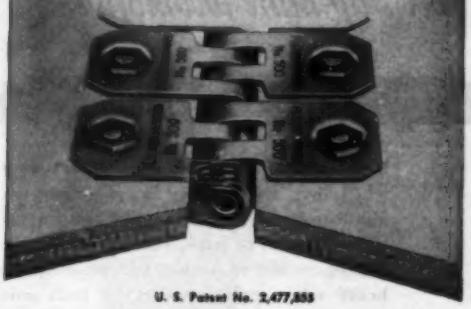
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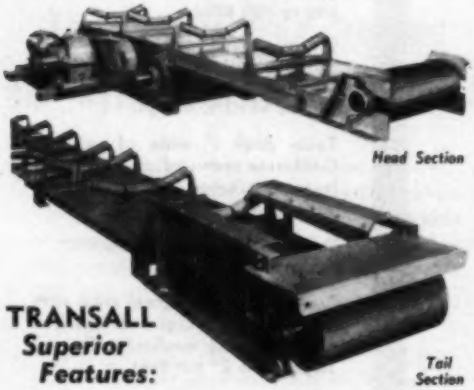
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LOCOMOTIVES—250 V DC B.B. MOTORS, ALL REBUILT, 36" TO 48" GAUGE

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2—13-ton Jeffrey MH-110
2—13-ton Jeffrey MH-110
1—10-ton Jeffrey MH-110
4—10-ton Goodman 54-B
13—6-ton Jeffrey MH-100 with reels
2—6-ton G.E. MM-810 with reels
4—6-ton Westinghouse 002-C with reels
4—6-ton G.E. MM-854 with reels
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SUBSTATION EQUIPMENT—330/275 V DC —2300/4000 V AC

3—500 KW Westinghouse Syn. M.G. Sets, 1200 RPM
1—500 KW Westinghouse Syn. M.G. Sets, 1200 RPM
3—150 KW G.E. Syn. M. G. Sets, 1200 RPM
2—150 KW Westinghouse Syn. M.G. Sets, 1200 RPM
2—300 KW G.E. Syn. Rotary Converters, Form P
2—300 KW G.E. Syn. Rotary Converters, Form P. Type HCC, 1200 RPM
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4—306 Goodman
2—460 Goodman
4—200 Goodman
4—No. 3 Myers-Whaley Automats, two years old.



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KW	Make	RPM	Volts	Type
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200	Westg.	1200	220/440	AC Syn.
150	Burke	900	2300	AC Syn.
100	Westg.	900	2300	AC Syn.
100	Delco	1200	220/440	AC Syn.

250 volt D.C. GENERATORS

KW.	Make	rpm	type
500	Cr. Wh.	375	CCM
375	West	400	SK
250	new Allis Chal	2200	EBL
150	Burke	900	B-70
100	Delco	1200	—
100	West	2100	SK
75	West	750	—
60	West	1150	—SK-153

250 volt D.C. MOTORS

hp	Make	rpm	type
600	Cr. Wh.	300/330	ccm
400	West	300	
250	Allis Chal.	1750	splash proof
120	G.E.	300/750	DMC
100	West	1700	SK
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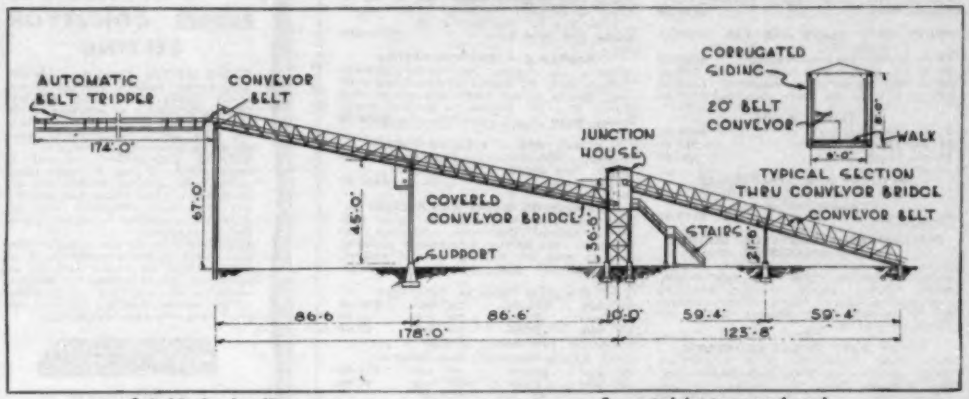
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Build your own conveyor; we have in stock standard sections, head and tail pulleys, screw takeups, gravity takeups, troughing and picking idlers, return rollers, belting, drives, speed reducers, sheaves, motors, etc. Phone us your order.

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200 KW G.E. 275 v. 1200R—MPC—ATI
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150 KW West. Rotory, 275 v.—1200R
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300	G.E.	450	IM	S.R.
160	G.E.	600	IK	S.C.
150	G.E.	600	ATI	Syn.
2—100	G.E.	450	IM	S.R.
100	Al.-Ch.	720	ARX	S.C.
100	West.	900		Syn.
100	West.	1200	CS	S.C.
75	G.E.	600	ITC	S.R.
75	West.	900	CS	S.C.
40	G.E.	900	MT	S.R.

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8 Ton Goodman 250 v. 44/428" Ga. 9104C2
8 Ton Goodman 500 v. 44/42" Ga. 9104C2
2—8 Ton Jeff. 250 v. 42" MM100
6 Ton Westgh. 250 v. 36" Ga. 904
6 Ton G.E. Battery 42/44" Ga.
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STRONG CARCASS—Constructed of finest quality 28 and 32 ounce tough cotton duck, properly treated and impregnated to avoid mildew from moisture and atmospheric conditions. Each ply thoroughly embedded in rubber to prevent ply separation.
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We carry in stock for your immediate requirements, Conveyor Belting in widths from 8 inches to 48 inches.

Width	Ply	Thickness Top Cover	Thickness Bottom Cover	Type of Duck Carcass
8"	4	1/16"	1/32"	28 Oz.
10"	4	1/16"	1/32"	28 Oz.
12"	4	1/16"	1/32"	28 Oz.
14"	4	1/16"	1/32"	28 Oz.
16"	4	1/8"	1/32"	28 Oz.
18"	4	1/8"	1/32"	28 Oz.
20"	4	1/8"	1/32"	28 Oz.
20"	5	1/8"	1/32"	28 Oz.
24"	4	1/8"	1/32"	28 Oz.
24"	5	1/8"	1/32"	28 Oz.
28"	5	1/8"	1/32"	28 Oz.
30"	4	1/8"	1/16"	32 Oz.
30"	5	1/8"	1/16"	32 Oz.
30"	6	1/8"	1/16"	32 Oz.
36"	6	1/8"	1/16"	32 Oz.
42"	5	1/8"	1/16"	32 Oz.
48"	9	1/8"	1/16"	32 Oz.

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1—300KW General Electric synchronous Motor Generator Set, AC and 450 HP, 2200 volts, type TS, 1200 RPM. Direct connected to type MCP, 300KW, 1200 RPM, 250/275 DC volts generator, complete with fully automatic switchboard.
1—100KW General Electric synchronous Motor Generator Set, AC and 155 HP, 2300 volts, type TS, 1200 RPM. Direct connected to type CD, 100KW, 1200 RPM, 250 volts DC generator, complete with switchboard.
1—75KW Westinghouse Motor Generator Set, 250 volts DC, 220 volts AC, complete with switchboard.

MINING MACHINES

7—8JE EJH Goodman DC shortwall mining machines, complete with bug dusters, hydraulic control, 8½' cutter bars, and Joy T1 cat trucks. (Like New)
4—8JE EL3 Goodman AC shortwall mining machines, complete with Joy T1 cat trucks.
3—Sullivan CLE5 longwall mining machines, 2/60/220 volts, with 4½' cutter bars.
6—112AA Goodman Universal DC shortwall mining machines. (With or Without truck.)
1—112AA Goodman Universal DC shortwall mining machine. (With trucks.)
2—12AA Goodman AC, 50 HP, standard shortwall mining machines. (With or Without trucks)

CRUSHERS

1—36 x 36 Jeffrey single roll crusher.
1—36 x 60 Link Belt double roll crusher.
1—24 x 48 McNally Pittsburgh double roll crusher.
1—30 x 36 United Iron Works single roll crusher.
1—24 x 24 Jeffrey single roll crusher.
1—24 x 24 Hercules single roll crusher.
1—24 x 24 Webster single roll crusher.
1—24 x 24 Stephens Adamson single roll crusher.
1—18 x 18 Jeffrey single roll crusher.
1—12 x 16 Eagle Iron Works double roll chipper, complete with hopper and 7-½ HP AC motor. (Mounted on one base. Like new.)
1—48" McNally Pittsburgh Vertical Pick Breaker.
2—American Pulverizer Company Ring Roll crushers.

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Several thousand feet of #6, 3/C, 2300 volts, lead covered armored cable.
Several thousand feet of 750,000 and 1,000,000 CM, bare stranded copper wire, long lengths.
Several thousand feet of 4/0, Figure 8, trolley wire, long lengths.
Several thousand feet of 0/0, Figure 8, trolley wire, long lengths.

LOCOMOTIVES (Ball Bearing)

Make	Type	Gauge
1—15 ton Jeffrey	MH110	42"
2—8 ton Goodman	82AO4T	36"
1—8 ton Goodman	82AO4T	42"
1—4 ton Goodman	42-J-4-T	36"
6—6 ton G. E.	HMH21A	42"
1—6 ton G. E.	HM703B	42"
1—6 ton Jeffrey	MH64	42"
1—8 ton Westinghouse	4-2-35-C-437	36"

DRILLS

Several Chicago Pneumatic, 472 and 473, AC and DC drills.

PIT CAR TRUCKS

150 sets—42" gauge, 14" diameter, Sanford Day Timken bearing pit car trucks.

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38—15 ton Sanford Day automatic drop bottom cars with multiple latch arch bar truck, 4 wheels under each end, 18" wheels, 36" gauge, Sanford Day roller bearing trucks. Overall dimensions: Overall length over bumpers 25'2"; Overall length inside 20'11⅛"; Overall width 6'10⅝"; Overall height 6'6". Size of door: Width 2'9". Length both doors 11'9½".

DUCKBILL UNITS

10—G20 AC Goodman duckbill units complete.
2—G20 DC Goodman duckbill units complete.

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Approximately 100 tons used 16# rails, random lengths.
Approximately 25 tons of new 30# rails, 20 ft. lengths.
Several hundred tons of 56# and 60# relaying rails, long lengths.
Several hundred tons of rails, 56# and up, suitable for roof bars, random lengths from 8½' and up.
We carry splices, angle bars, track bolts, and track spikes in stock.

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1—Stephens Adamson two deck vibrator, size 4' x 10'.
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8—11BU DC Joy Loaders.
3—14BU DC Joy Loaders.

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1—Jeffrey Blower Fan with 1½ HP Enclosed AC Motor
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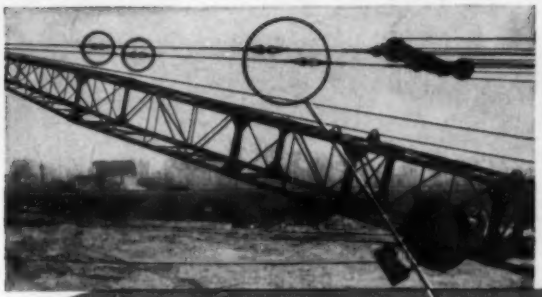
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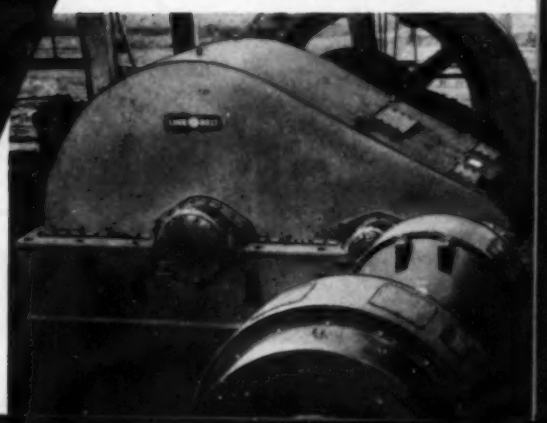
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